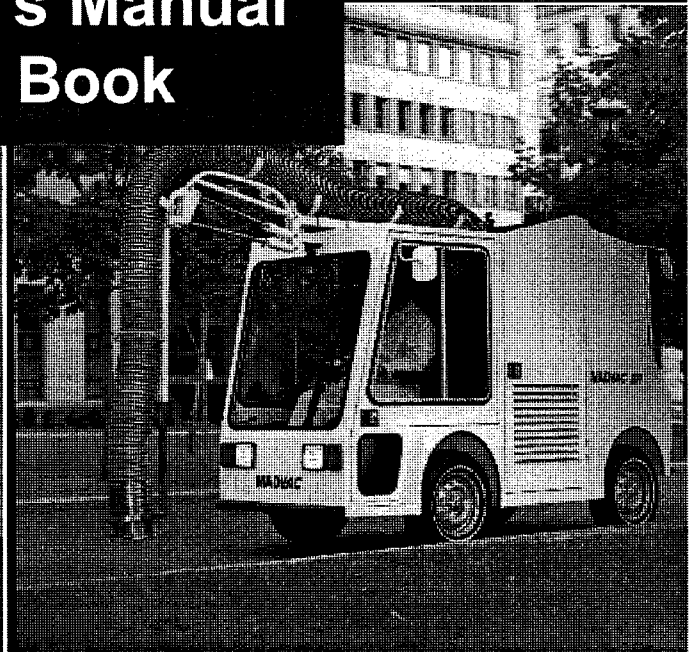


**MADVAC 231 D**  
**Operator's Manual**  
**Parts Book**



**MADVAC**

The World's Best Litter Collection System

# TABLE OF CONTENTS

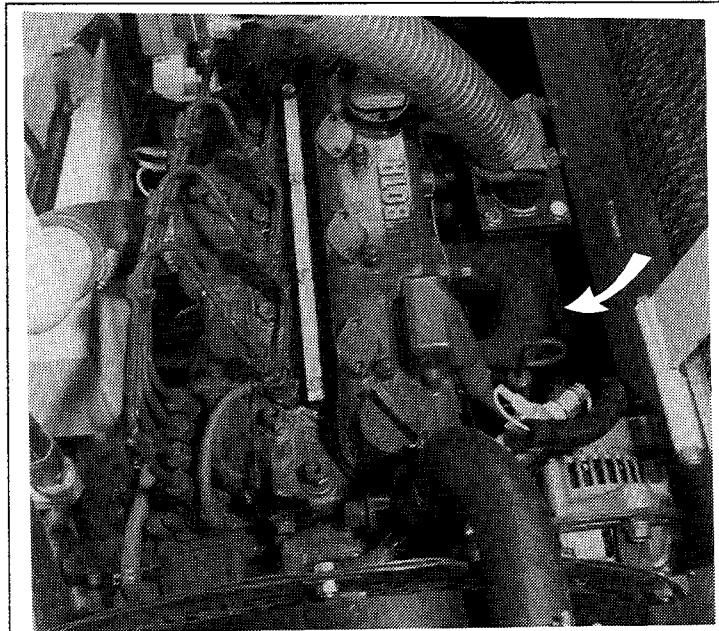
SECTION	DESCRIPTION	PAGE
<b>1</b>	<b>Introduction .....</b>	<b>1</b>
<b>2</b>	<b>Safety .....</b>	<b>2</b>
2.1	General Safety .....	3
2.2	Operating Safety .....	4
2.3	Hydraulic Safety .....	4
2.4	Maintenance Safety .....	5
2.5	Transport Safety .....	5
2.6	Tire Safety .....	5
2.7	Storage Safety .....	6
2.8	Refueling Safety .....	6
2.9	Battery Safety .....	6
2.10	Safety Signs .....	6
2.11	Sign-Off Form .....	7
<b>3</b>	<b>Safety Sign Locations .....</b>	<b>8</b>
<b>4</b>	<b>Operation .....</b>	<b>10</b>
4.1	To the New Operator or Owner .....	10
4.2	How The Machine Works .....	11
4.3	Machine Break-In .....	12
4.4	Pre-Operation Checklist .....	12
4.5	Controls .....	13
4.5.1	Upper Cab Instrument Panel .....	13
4.5.2	Lower Cab Instruments .....	17
4.5.3	Engine Compartment .....	19
4.6	Starting .....	20
4.7	Stopping .....	21
4.8	Operating .....	21
4.9	Emptying The Container .....	24
4.10	Transporting .....	25
4.11	Storage .....	26
4.11.1	Placing In Storage .....	26
4.11.2	Removing From Storage .....	26
<b>5</b>	<b>Service and Maintenance .....</b>	<b>27</b>
5.1	Service .....	27
5.1.1	Fluids and Lubricants .....	27
5.1.2	Greasing .....	28
5.1.3	Servicing Intervals .....	29
5.1.4	Service Record .....	38
5.2	Maintenance .....	39
5.2.1	Engine Oil and Filter Changing .....	39
5.2.2	Fuel Filter .....	40
5.2.3	Air Cleaning Maintenance .....	40
5.2.4	Cleaning Engine and Compartment .....	41
5.2.5	Hydraulic Oil Filter Changing .....	42
5.2.6	Changing Hydraulic Oil .....	43
5.2.7	Control Cable Lubrication .....	43
5.2.8	Hydraulic System Testing .....	44
5.2.9	Cleaning Dust Screen .....	44

SECTION	DESCRIPTION	PAGE
5.3	Adjustments .....	45
5.3.1	Intake Tube Lift Speed .....	45
5.3.2	Electrical System .....	45
5.3.3	Pedal Angle Adjustment .....	46
5.3.4	Brake Adjustment .....	46
5.3.5	Neutral Position and Neutral Start Adjustment .....	47
5.3.6	Intake Tube Replacement .....	48
5.3.7	Engine Speed Settings .....	48
5.4	Towing .....	48
6	<b>Options .....</b>	<b>49</b>
6.1	15 Foot Extension Inlet .....	49
6.2	36 Inch Vacuum Head .....	49
6.3	Differential Lock .....	49
6	<b>Troubleshooting .....</b>	<b>50</b>
8	<b>Specifications .....</b>	<b>52</b>
8.1	Mechanical .....	52
8.2	Electrical 231D Diesel .....	54
8.3	Hydraulic .....	56
8.4	Bolt Torque .....	58
9	<b>Parts list .....</b>	<b>60</b>
9.1	Parts list index .....	61
10	<b>Index .....</b>	<b>124</b>

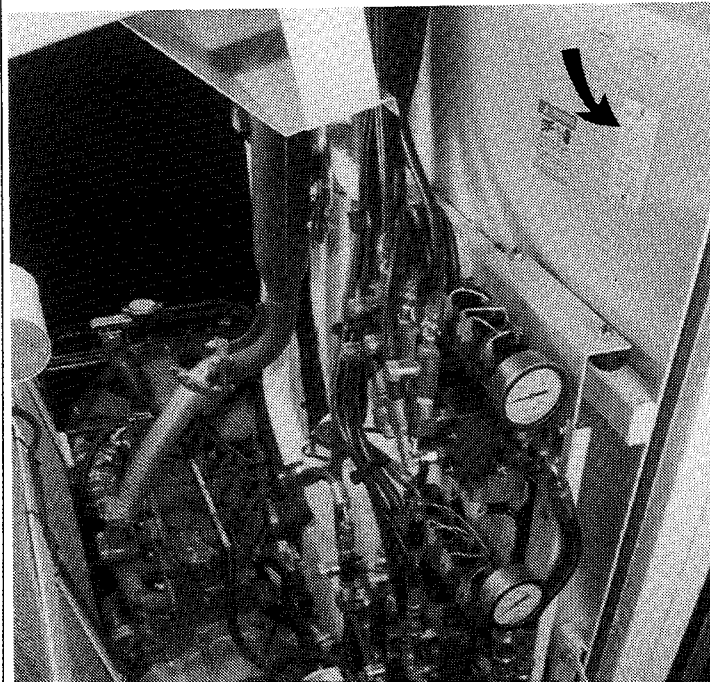
# SERIAL NUMBER LOCATION

Always give your dealer the serial number of your MADVAC Vacuum when ordering parts or requesting service or other information.

The serial number plates are located where indicated. Please mark the number in the space provided for easy reference.



Engine



Chassis

## SERIAL NUMBER LOCATIONS

Model \_\_\_\_\_

Chassis Serial Number \_\_\_\_\_

Engine Serial Number \_\_\_\_\_





# 1 INTRODUCTION

Congratulations on your choice of a CBC Municipal Equipment MADVAC Litter Vacuum to complement your litter collection operation. This equipment has been designed and manufactured to meet the needs of a discriminating buyer for the vacuum collecting of litter.

Safe, efficient and trouble free operation of your MADVAC Litter Vacuum requires that you and anyone else who will be operating or maintaining the Vacuum, read and understand the Safety, Operation, Maintenance and Trouble Shooting information contained in the Operator's Manual.



This manual is applicable to all the Model 231D machines built by CBC Municipal Equipment. Use the Table of Contents or Index as a guide when searching for specific information.

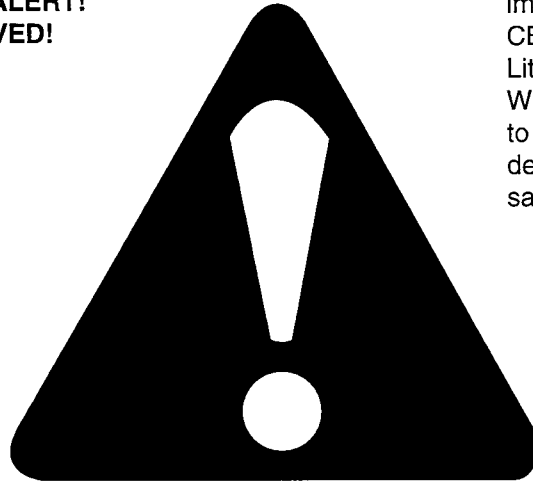
Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your MADVAC dealer if you need assistance or information.

**OPERATOR ORIENTATION** - The directions left, right, front and rear, as mentioned throughout this manual, are as seen from the driver's seat and facing in the direction of travel.

## 2 SAFETY

### SAFETY ALERT SYMBOL

This Safety Alert symbol means  
**ATTENTION! BECOME ALERT!**  
**YOUR SAFETY IS INVOLVED!**



The Safety Alert symbol identifies important safety messages on the CBC Municipal Equipment MADVAC Litter Vacuum and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

#### 3 Big Reasons

**Accidents Disable and Kill**  
**Accidents Cost**  
**Accidents Can Be Avoided**

#### SIGNAL WORDS:

Note the use of the signal words **DANGER**, **WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

**DANGER** - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

**WARNING** - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

**CAUTION** - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

# SAFETY

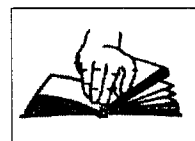
**YOU** are responsible for the **SAFE** operation and maintenance of your CBC Municipal Equipment MADVAC Litter Vacuum. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the MADVAC be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices that should be adhered to while operating the Vacuum.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- MADVAC owners must give operating instructions to operators or employees before allowing them to operate the Vacuum, and at least annually thereafter per OSHA regulation 1928.57.
- The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. All accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Think **SAFETY!** Work **SAFELY!**

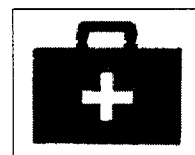
## 2.1 GENERAL SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining adjusting or unplugging the MADVAC .



2. Only trained competent persons shall operate the Vacuum. An untrained operator is not qualified to operate the machine.

3. Have a first-aid kit available for use should the need arise and know how to use it.



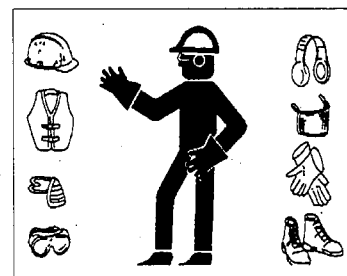
4. Do not allow riders.

5. Have a fire extinguisher available for use should the need arise and know how to use it.



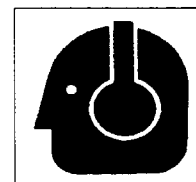
6. Wear appropriate protective gear. This list includes but is not limited to:

- A hard hat
- Protective boots with slip resistant soles
- Protective goggles
- Heavy gloves
- Hearing protection
- Filter Mask



7. Place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

8. Wear appropriate hearing protection when operating for long periods of time.



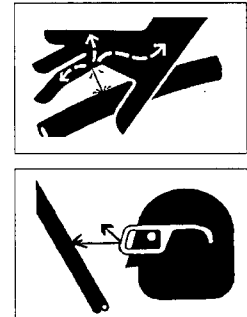
9. Review safety related items with all personnel annually.

## 2.2 OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, servicing, adjusting or unplugging.
2. Do not allow riders on the machine during operation or transport.
3. Install and secure all guards and shields before starting or operating.
4. Place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
5. Be sure all controls are in neutral before starting.
6. Clear the area of all bystanders front and back, especially small children, before starting or emptying the container.
7. Keep all hydraulic components clean and in good repair.
8. Wear proper eye and hand protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop.
9. Maintain a safe speed when making sharp corners or going over rough, uneven terrain.
10. Clean the lights, mirrors and SMV (Slow Moving Vehicle) emblem before operating or transporting.
11. Always use hazard warning flashers when operating.
12. Wear appropriate hearing protection when operating for long periods of time.
13. Use hazard flashers and beacon when dumping.
14. Always use safety seat belt when driving or operating the machine.
15. Review safety instructions with all operators annually.

## 2.3 HYDRAULIC SAFETY

1. Make sure that all components in the hydraulic system are kept in good condition and are clean.
2. Replace any worn, cut, abraded, flattened or crimped hoses and metal lines.
3. Relieve pressure before working on hydraulic system
4. Do not attempt any makeshift repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.
5. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.
6. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.
7. Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged.



## 2.4 MAINTENANCE SAFETY

1. Review the Operator's Manual and all safety items before working with, maintaining or operating the MADVAC.
2. Place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Follow good shop practices:

- Keep service area clean and dry.
- Be sure electrical outlets and tools are properly grounded.
- Use adequate light for the job at hand.



4. Before applying pressure to hydraulic system make sure that all connections are tight and that all hoses and fittings are in good condition.
5. Keep hands, feet, clothing and hair away from all moving and/or rotating parts.
6. Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments or emptying.
7. Do not attempt any adjustment or maintenance to any system of the Vacuum when the machine is in motion.
8. Make sure that all guards and shields are properly installed and secured before operating the Vacuum.
9. Securely support the machine using blocks or safety stands before working beneath it or changing tires.
10. Store and transfer fuel, solvents, cleaners or any flammable liquids only in safety standard approved containers.

## 2.5 TRANSPORT SAFETY

1. Read and understand ALL the information in the Operator's Manual regarding procedures and SAFETY when operating the MADVAC in the workplace and/or on the road.
2. Always travel at a safe speed. Use caution when making corners or meeting traffic.
3. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
4. Do not allow riders on any part of the machine during either field operation or road and highway travel.
5. Always use hazard warning flashers and the rotating beacon on the MADVAC when transporting unless prohibited by law.

## 2.6 TIRE SAFETY

1. Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.
2. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.
3. Have a qualified tire dealer or repair service perform required tire maintenance.

## 2.7 STORAGE SAFETY

1. Store unit in an area away from human activity.
2. Do not permit children to play on or around the stored Vacuum.

## 2.8 REFUELING SAFETY

1. Handle fuel with care. It is highly flammable.
2. Allow engine to cool for 5 minutes before refueling. Clean up spilled fuel before restarting engine.
3. Do not refuel the machine while smoking or when near open flame or sparks.
4. Fill fuel tank outdoors.
5. Prevent fires by keeping machine clean of accumulated trash, grease and debris.



## 2.10 SAFETY SIGNS

1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety signs are available from your Distributor or the factory.

### How to Install Safety Signs:

- Be sure that the installation area is clean and dry.
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

## 2.9 BATTERY SAFETY

1. Keep all sparks and flames away from batteries, as gas given off by electrolyte is explosive.
2. Avoid contact with battery electrolyte: wash off any spilled electrolyte immediately.
3. Wear safety glasses when working near batteries.
4. Do not tip batteries more than 45 degrees, to avoid electrolyte loss.
5. To avoid injury from spark or short circuit, disconnect battery ground cable before servicing any part of electrical system.

## 2.11 SIGN-OFF FORM

CBC Municipal Equipment Ltd. follows the general Safety Standards specified by the Society of Automotive Engineers (SAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the MadVac Litter Vacuum must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. We feel that an untrained operator is unqualified to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the Operator's Manual and have been instructed in the operation of the equipment.

## SIGN-OFF FORM

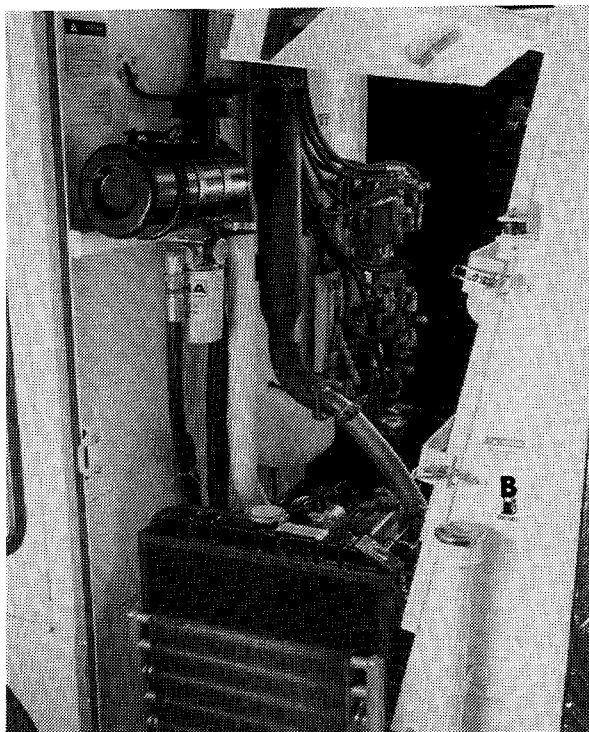
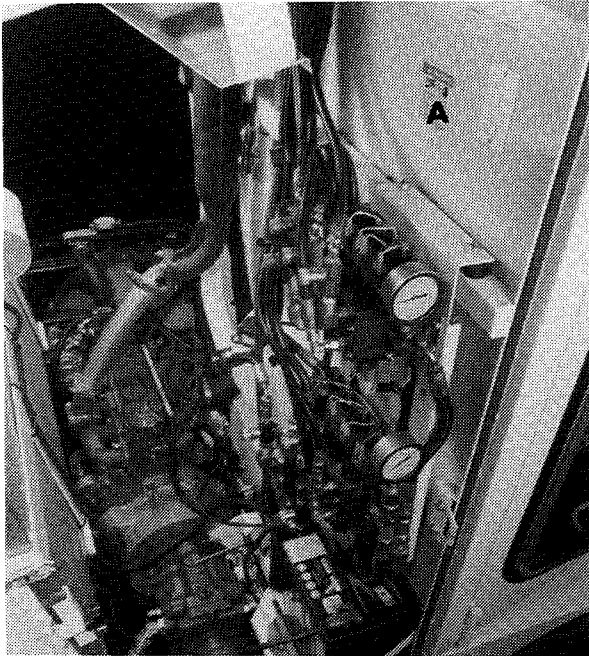
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### 3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

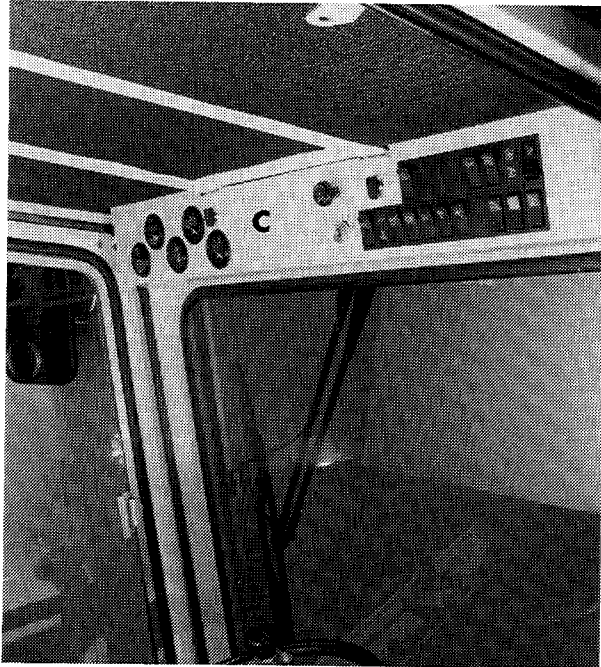


REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

### 3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



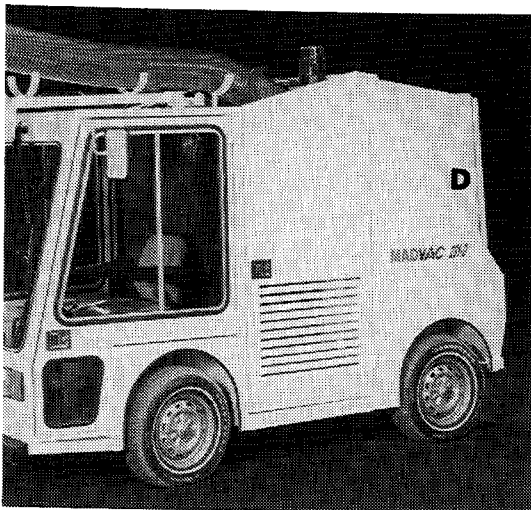
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#### CAUTION

1. Read Operator's Manual before using.
2. Place all controls in neutral, shut off engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Do not allow riders during operation or transport.
4. Clear the area of bystanders, especially children, before starting or emptying.
5. Be sure all hydraulic components are tight and not leaking before operating.
6. Wear proper eye and hand protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop.
7. Maintain a safe speed when making sharp corners or going over rough, uneven terrain.
8. Clean the lights and SMV emblem before transporting.
9. Always use hazard warning flashers when operating.
10. Wear appropriate ear protection when operating for long periods of time.
11. Review safety instructions annually.

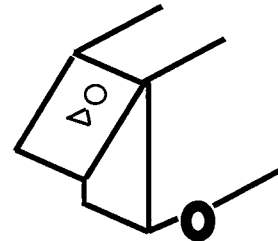
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D



#### DANGER



#### PINCHING HAZARD

To prevent serious injury or death:

1. Stay away from machine when opening and closing gate or emptying box. Keep others away.
2. Do not open and close gate or empty box when people are near the machine.

27295

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

## 4 OPERATION



### OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, servicing, adjusting or unplugging.
2. Do not allow riders on the machine during operation or transport.
3. Install and secure all guards and shields before starting or operating.
4. Place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
5. Be sure all controls are in neutral before starting.
6. Clear the area of all bystanders front and back, especially small children, before starting or emptying the container.
7. Keep all hydraulic components clean and in good repair.
8. Wear proper eye and hand protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop.
9. Maintain a safe speed when making sharp corners or going over rough, uneven terrain.
10. Clean the lights, mirrors and SMV (Slow Moving Vehicle) emblem before operating or transporting.
11. Always use hazard warning flashers when operating.
12. Wear appropriate hearing protection when operating for long periods of time.
13. Use hazard flashers and beacon when dumping.
14. Review safety instructions with all operators annually.

### 4.1 TO THE NEW OPERATOR OR OWNER

The CBC Municipal Equipment MADVAC is designed to vacuum up a wide variety of trash, debris and other materials from around a variety of obstructions. It has the capability to pick up virtually anything that will fit through the intake tube. Its unique design provides for self-compacting as the trash enters the collecting canister. The 4 wheeled stance provides virtually unlimited manoeuvrability around almost any obstacle. A hydraulically assisted intake arm allows the operator to easily reach all trash within an arc of 150° around the driver's seat. Trash is collected in the container on the back of the machine.

**It is the responsibility of the owner or operator to read this manual before starting. Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the environment.**

Many features incorporated into this machine are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum field efficiency. By following the operating instructions in conjunction with a good maintenance program, your Vacuum will provide many years of trouble-free service.

## 4.2 HOW THE MACHINE WORKS

The MADVAC consists of a large container under vacuum for accumulating trash while it is being gathered. Trash enters the container through a hydraulically assisted intake tube and arm. The arm is controlled by the operator with a joy stick and can swing through a 150° arc around the front of the machine. Vacuum to the system is provided by a hydraulically powered fan at the bottom of the container. Air flows through the system due to the action of the fan and is expelled out the bottom of the container. As the air flows into the inlet tube, it picks up trash and conveys it through the tube into the container. The trash is held in the container with a porous liner.

Power is provided by a diesel motor in the center compartment. Hydraulic pumps to power the systems are mounted to the motor flywheel. Tractive power is provided by a hydraulic motor on each rear wheel.

The machines' 4 wheel stance provides excellent manoeuvrability to operate in congested and hard to reach places and stability for uneven terrain.

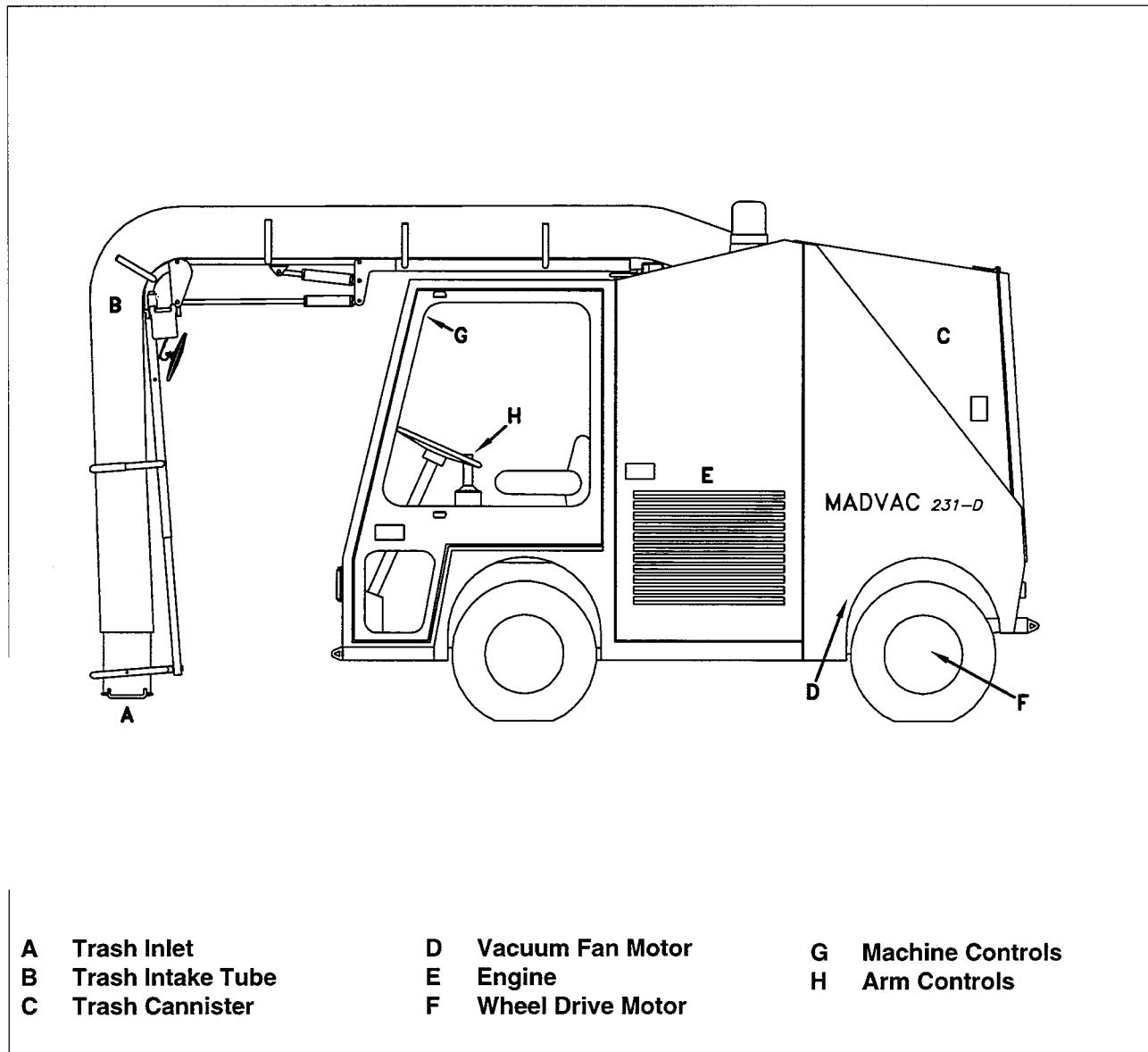


Fig. 1 MACHINE COMPONENTS

## 4.3 MACHINE BREAK-IN

Although the machine has been run at the factory, a special inspection procedure has been developed to insure the integrity of the mechanical and hydraulic systems. When using the machine for the first time, follow this procedure.

### A. Before Starting:

1. Read the engine and MadVac Operator's Manuals.

### B. At 1/2, 2, 5 and 10 Hours:

1. Check all machine fluid levels: Fuel, coolant, hydraulic oil, and engine oil. Refuel or top up fluid level as required.
2. Retorque wheel bolts.
3. Check all hydraulic fittings and components for leaks. Tighten if required to stop any leaks.
4. Check for loose hardware. Tighten to specified torque.
5. Check the speed/direction pedal to be sure it is set for operator comfort. Adjust as required.
6. Check the dust collector screen and clean if required.
7. Lubricate the points defined in the Maintenance section.
8. Then go to the service schedule as defined in the Maintenance section.

### C. At 50 Hours:

1. Change the engine and hydraulic oil and filters.
2. Replace with the specified oil and filters.
3. Then go to the oil and filter replacement schedule as defined in the Maintenance section.

## 4.4 PRE-OPERATION CHECKLIST

Efficient and safe operation of the MADVAC requires that each operator reads and understands the operating procedures and all related safety precautions outlined in this section. A pre-operation checklist is provided for the operator. It is important for both personal safety and maintaining the good mechanical condition of the machine that this checklist is followed.

Before operating the MADVAC and each time there-after, the following areas should be checked off:

1. Check all machine fluid levels: Fuel, coolant, hydraulic oil, washer fluid and engine oil. Refuel or top up fluid levels as required.
2. Inspect all hydraulic lines, hoses and fittings for tightness. Use a clean rag to remove any dirt that has accumulated on any of the fittings.
3. Check the tires and ensure that they are inflated to the specified pressure.
4. Check the trash container. Empty if full.
5. Check the dust collector screen and clean if required. Empty collector box under the screen.
6. Clean engine air intake filter container cover. Clean the air filter if the restriction indicator is in the red.
7. Clean the lights and SMV emblem to ensure that they can be seen by other vehicles.
8. Check all lights and flashers to ensure they are functioning properly.
9. Clean all the mirrors on the machine.

## 4.5 CONTROLS

Before starting to work, all operators should familiarize themselves with the location and function of the controls. Locate the machine in a large open area to provide unobstructed manoeuvring during the training period.

### 4.5.1 UPPER CAB INSTRUMENT PANEL

An instrument panel is located on the front of the cab at the roof line.

#### 1. Left side:

a. **Hourmeter:** Displays the total operating hours of the machine. The hourmeter is electrically powered and runs whenever the ignition switch is on.

b. **Fuel:** Displays fuel level in tank.

c. **Ammeter:** Displays the amount of charge going to the battery.

d. **Engine Coolant Temperature:** Displays the engine coolant temperature. The temperature should always remain in the green band between 190° and 210° F (90° and 100°C) when operating at rated RPM. Should it go over that range, stop immediately and clean the radiator, oil cooler and the space between the radiator and cooler.

e. **Engine Oil Pressure:** Displays the engine oil pressure. The pressure should always remain in the 35 to 60 psi range when operating at rated RPM. Should it drop below that, stop immediately. Determine the cause before resuming operation.

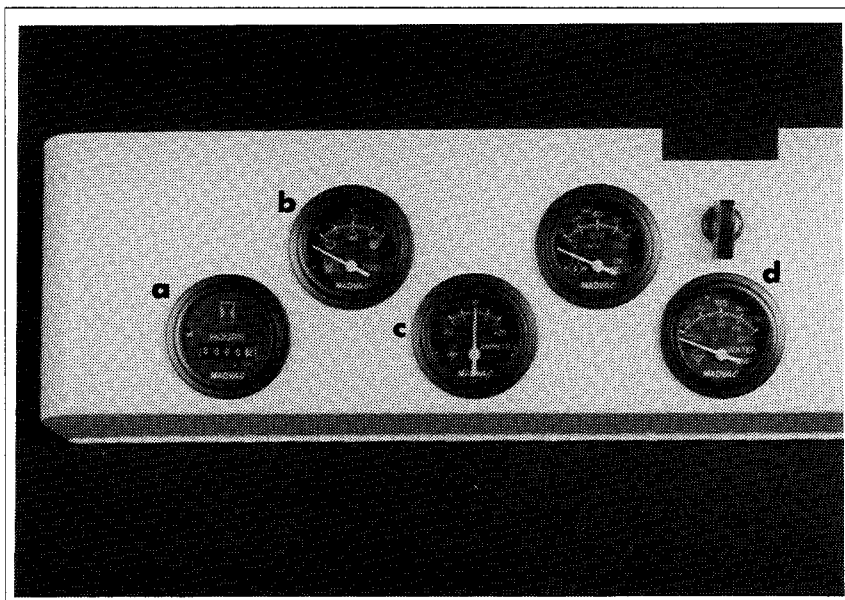


Fig. 2 INSTRUMENT - LEFT SIDE

## 4.5.1 UPPER CAB INSTRUMENT PANEL (cont'd)

### 2. Right Side:

- a. **Wiper:** This 3 position rotary switch controls the wiper and washer functions. In its most counterclockwise position, the wiper is ON at its slow speed. Turn clockwise another position for its fast speed. Press for washer pump.
- b. **Dome Light:** This rocker switch controls the electrical power to the dome or cab interior light. Depress the bottom portion of the switch to turn the light OFF. Depress the top portion to turn the light ON. When the vehicle instrument panel lights are turned ON, a green light in the upper portion of the switch will be illuminated.
- c. **Parking Brake Light:** This red light will come on when parking brake is engaged.
- d. **Flasher Light:** This green light will come on when the flashers are used.
- e. **Hazards:** This rocker switch controls the hazard lights. Depress the upper portion of the switch to activate. The red light will flash on/off when the hazard lights are used. Depress the lower portion to deactivate.
- f. **Shaker:** This rocker switch controls the electrical power to the shaker on the discharge air screen and filter. Depress the bottom portion to turn the shaker OFF. Depress the top portion of the switch to turn the shaker ON. When the shaker is turned On, a green light in the upper portion of the switch will be illuminated. The shaker will not operate if vacuum fan is ON.
- g. **Vacuum:** This rocker switch is the master ON/OFF switch for the vacuum fan. Depress the bottom portion of the switch to turn the vacuum fan OFF and the top to turn ON. When the fan is ON, the green fan light to the right of the rocker switch will be illuminated. The vacuum fan will run ONLY when the container is seated in the down position.
- h. **Vacuum Fan Light:** This green light is illuminated when the vacuum fan is ON and goes out when the fan is OFF. Since the fan shuts off when the container lifts out of its seat, either the fan light or the container seated light will be on but not both.
- i. **Container Seated Light:** This yellow light is illuminated when the container is NOT seated in the frame and goes out when the container is fully seated.
- j. **Joy Stick ON/OFF:** This rocker switch controls the power to the inlet tube joy stick. Depress the top portion of the rocker switch to activate the joy stick and the bottom to turn it OFF. Always turn the joy stick OFF before transporting or leaving the cab.
- k. **Ignition Switch:** This 3 position rotary key switch controls the ignition circuit of the machine. In its most counterclockwise position, the ignition circuit is locked and the engine is OFF. Turn clockwise to the first position for RUN to turn the ignition circuit ON. Turn to the next position to engage the starter. This second clockwise position is spring-loaded and must be held to engage the starter. Release the key as soon as the engine starts and it will return to the run position.
- l. **Glow Plug:** This rocker switch is the master ON/OFF switch for the glow plugs in the engine cylinders. Depress the spring-loaded top portion of the switch to turn the glow plug ON. Release the switch and it will return to its OFF position. Always use the glow plug when the engine is cold. Normally 20 seconds is sufficient prior to starting the engine.
- m. **Engine Oil Pressure Light:** This red light is illuminated when the engine oil pressure drops below its pre-set value. Stop the engine immediately when the light comes ON. Determine the cause of the low pressure and correct before resuming work.

## 4.5.1 UPPER CAB INSTRUMENT PANEL (cont'd)

- n. **Engine Coolant Temperature Light:** This red light is illuminated when the engine coolant temperature exceeds its preset value. Stop the engine immediately when the light comes ON. Determine the cause of the excessive temperature and correct before resuming work. Normally cleaning the radiator, condenser, oil cooler and the spaces between them will correct the problem.

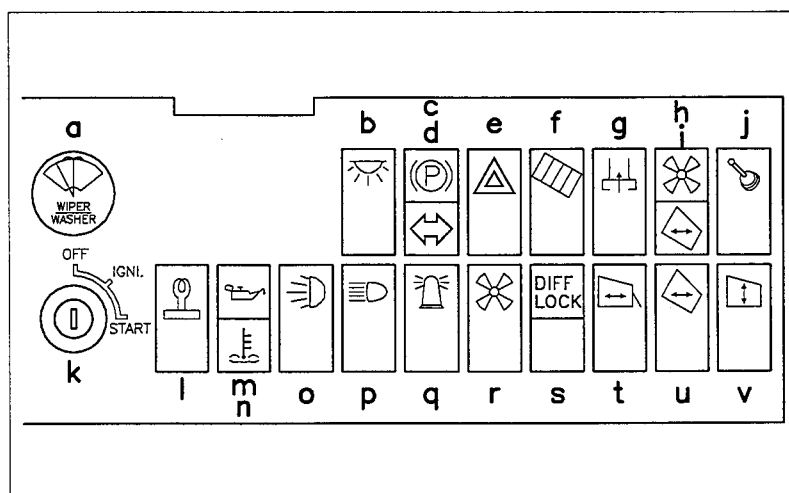


Fig. 3 INSTRUMENTS RIGHT SIDE

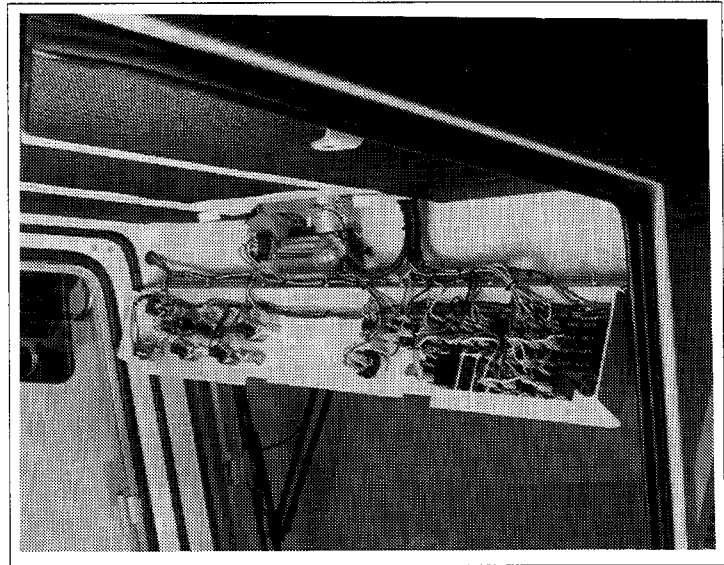
- o. **Lights:** This 3 position rocker switch controls the lights on the machine. Depress the bottom portion of the switch to turn the lights OFF. Center the switch to turn the parking lights ON. Depress the top portion of the switch to turn the headlights ON.
- p. **High/Low Beams:** This rocker switch controls the high or low beam setting for the headlights. Depress the bottom portion of the switch to set for low beam. Depress the top portion of the switch to set for high beam. When the headlights are set for high beam operation, a blue light illuminates the upper portion of the switch.
- q. **Beacon:** This rocker switch is the master ON/OFF control of the beacon. Depress the bottom portion of the switch to turn the beacon OFF. Depress the top portion to turn the beacon ON. When the beacon is ON, a green light illuminates the upper portion of the switch.
- r. **Defrost Fan:** This 3 position rocker switch controls the defrost fan and its operating speed. Depress the lower portion of the switch to turn the defrost fan OFF. Center the switch to set the fan at LOW speed. Depress the upper portion of the switch to set the defrost fan at its HIGH speed. The fan is located in the upper left corner of the cab.
- s. **Differential Lock (Optional):** This rocker switch controls a precision hydraulic oil flow divider system to the traction drive motors. Engage when going over rough terrain by pressing top portion of switch.
- t. **Container Rear Door:** This rocker switch controls the open and close function of the container rear door. Depress the lower portion of the switch to close the rear door. Depress the upper portion of the switch to open the rear door. A green light will illuminate the upper portion of the switch when lights are turned on.
- u. **Container Tilt:** This rocker switch controls the tilt function of the container. Depress the lower portion of the switch to level the container. Depress the upper portion of the switch to tilt the container back when emptying. A light will illuminate the upper portion of the switch when lights are on.
- v. **Container Lift:** This rocker switch controls the lift function for the container. Depress the lower portion of the switch to lower the container. Depress the upper portion of the switch to raise the container. A green light will illuminate the upper portion of the switch when lights are on.



## 4.5.1 UPPER CAB INSTRUMENT PANEL (cont'd)

### 3. Fuse Block:

A fuse panel for all the electrical systems is located behind the right hand side of the control panel. Release the panel latches and swing the panel down to gain access to the fuse block. Refer to the Maintenance Section and Electrical Schematic for fuse size and circuit definition.



**Fig. 4 FUSE BLOCK**

## 4.5.2 LOWER CAB INSTRUMENTS

The other controls for the remaining functions are located in front of and on each side of the operator.

### 1. Forward Controls:

- a. **Steering Wheel:** Controls the direction of travel. Turn the wheel clockwise to move to the right and counter-clockwise to move to the left.
- b. **Turn Signals:** Controls the turn signals. Push forward to signal a right turn . Pull back to signal a left turn.

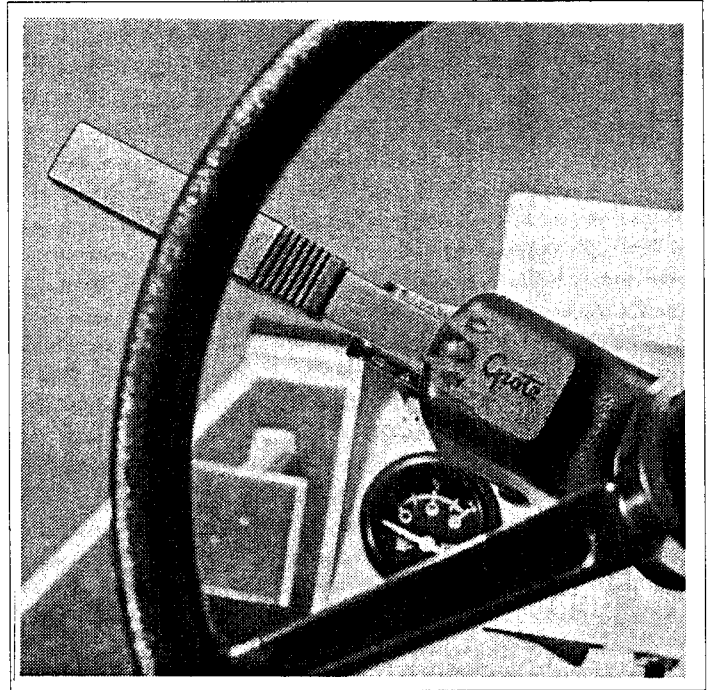


Fig. 5 FORWARD CONTROLS

### 2. Floor Level Controls:

- a. **Right Pedal:** This pedal is the speed and direction control of the machine. It must be in its centered position to start the engine. Depressing the front part of the pedal with the toes will move the machine in the forward direction. Depress the pedal further to increase the forward speed.  
  
To move in the reverse direction, depress the rear part of the pedal with the heel. Depress it further to increase rearward speed.
- b. **Left Pedal:** This pedal is the service and park brake. Depress the pedal to apply the brakes on the front wheels.

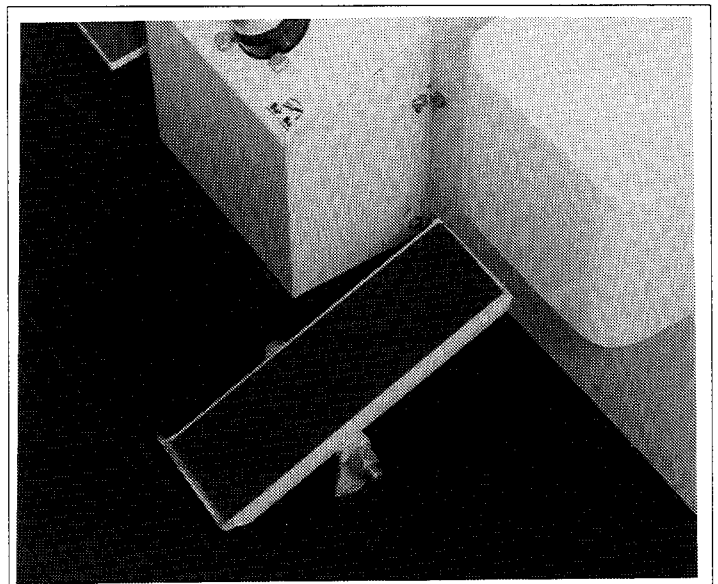


Fig. 6 SPEED/DIRECTION PEDAL

## 4.5.2 LOWER CAB INSTRUMENTS (cont'd)

### 3. Right Console Controls:

- a. **Joy Stick:** This 2 degree of freedom stick is used to set the for/ aft and left/right position of the inlet tube. Push the stick forward to move the inlet away from the machine and pull back to move the inlet toward the machine. Push the stick to the right to swing the inlet tube to the right and left to swing the inlet to the left.
- b. **Inlet Tube Height Control:** The operator can raise or lower the height of the intake tube by depressing the rocker switch on the top of the joy stick. This is a momentary contact, double poled, spring centered that is best operated with the thumb.

Depressing the left side of the rocker switch raises the intake tube. Depressing the right side lowers the intake tube.

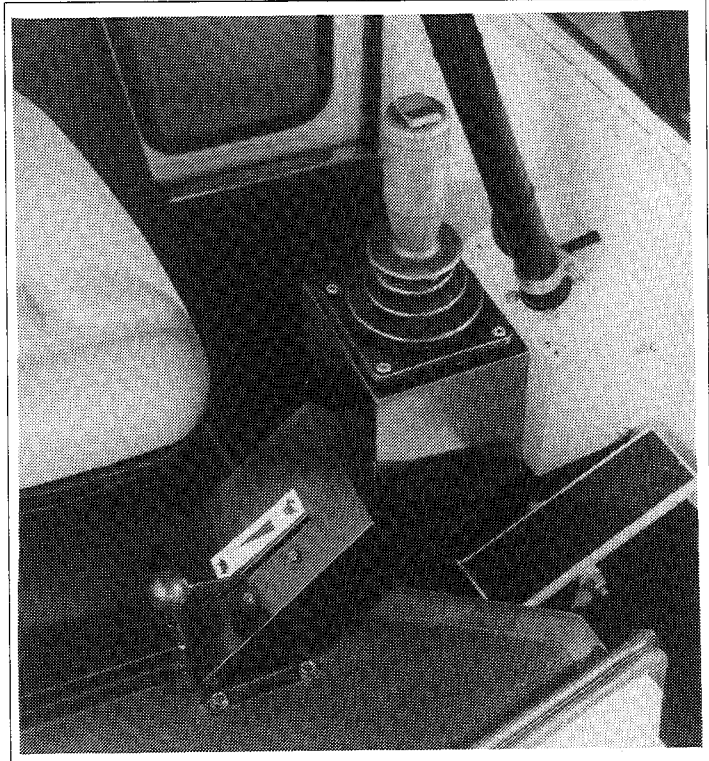


Fig. 7 INLET POSITION CONTROLS

- c. **Console Latch:** The joy stick mounting frame is designed with a hinge to allow the joy stick to be flipped back out of the way. Release the latch and flip the joy stick and frame back out of the way if you are leaving the cab through the right door. Always return the joy stick to its operating position and relock the latch before resuming operation.
- d. **Throttle:** This lever controls the throttle position on the engine. Move the lever forward to increase engine speed and back to decrease RPM. Use the ignition key to stop the engine.
- e. **Park Brake:** This lever controls the application of the park brake. Pull the lever up to apply the park brake and push down to release. Always engage the park brake before leaving the cab.

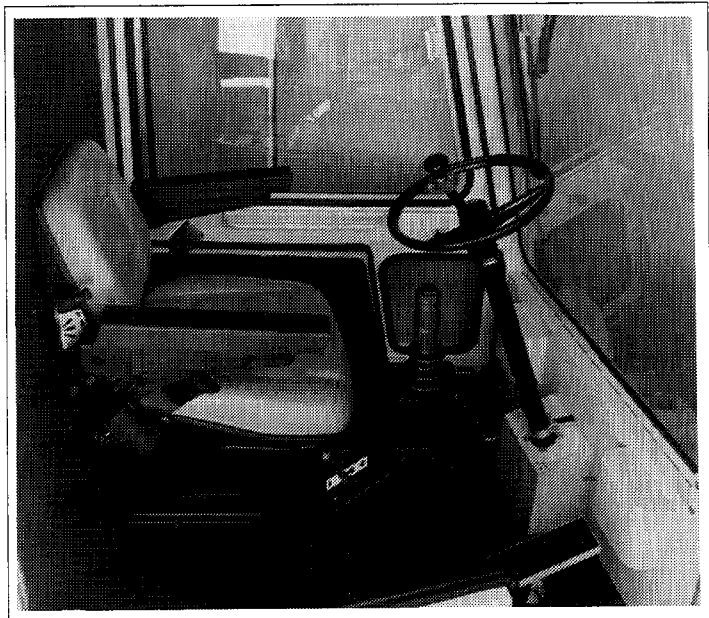


Fig. 8 RIGHT CONSOLE CONTROLS

## 4.5.2 LOWER CAB INSTRUMENTS (cont'd)

### 4. Left Console Air Conditioning Controls (Optional):

An optional console can be mounted in the cab to the left of the operator that incorporates a heater and air conditioning components. These controls are used to operate the system.

- a. **Temperature Control:** This rotary switch sets the operating temperature for the system. In the vertical setting, the air conditioner compressor is off. Turn the control clockwise from its vertical position to turn the air conditioner ON and increase the cooling of the air conditioner.

During cold weather, turn the conditioner control counterclockwise to the off position. Open heater valve located below engine radiator to allow the flow of hot engine coolant through the heater core. Increase the heating by selecting the High or Low position on the blower switch.

- b. **Blower Switch:** This three position switch controls the speed of the blower. In the center position the blower is Off.

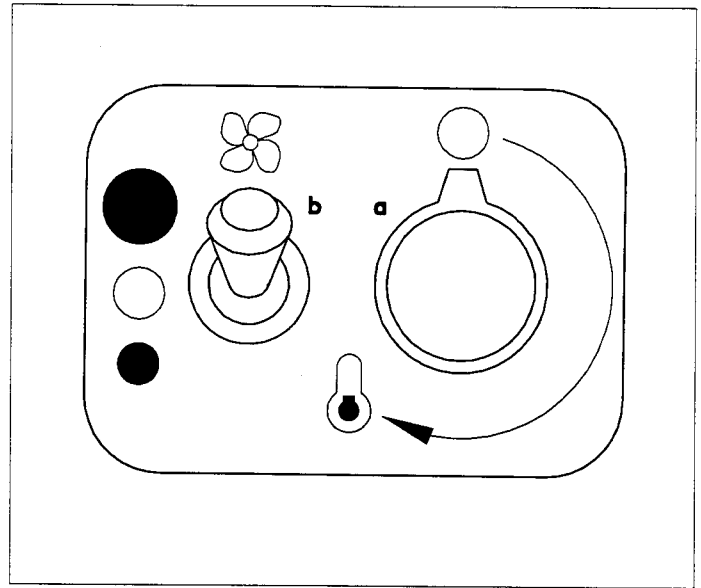


Fig. 9 AIR CONDITIONING CONTROLS

#### NOTE

The temperature control will not function unless the fan speed switch is set in low, or high.

## 4.5.3 ENGINE COMPARTMENT

1. **Tow Valve:** The piston pump for the traction drive system on the back of the engine is equipped with a "Flow Valve" to bypass oil around the pump. By bypassing the oil, the unit can be towed. Turn the valve on top of the pump at right angles to the axis of the pump before towing. Turn the valve parallel to the axis to move the unit under its own power.

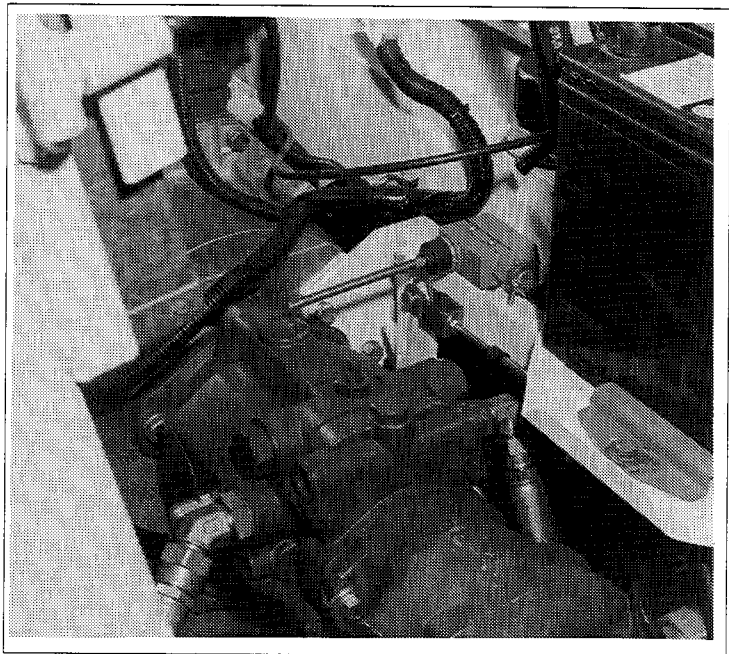


Fig. 10 TOW VALVE

## 4.6 STARTING

When starting the machine, follow this procedure:

1. Clear the area of bystanders front and rear, especially small children, before starting.
2. Remove all foreign objects from the machine.
3. Engage the park brake. Wear the safety seat belt.
4. Check that the vacuum fan is OFF, the joy stick power is OFF and the joy stick frame is securely locked in its operating position.
5. Check that the direction/speed control pedal is in its centered neutral position to engage the neutral start switch. The neutral start switch must be engaged to prevent machine movement when the engine starts. If the machine moves when the engine starts, stop immediately and adjust the neutral start linkage (See maintenance Section).
6. Pull the throttle lever to its mid range for starting.
7. Turn the ignition switch to the RUN position.
8. Depress the glow plug button for 20 seconds to heat the cylinders if the engine is cold.
9. Turn the ignition switch to the START position to engage the starter.
10. Release the key when the engine starts.
11. Turn the vacuum fan ON.
12. Turn the joy stick controls ON.
13. Release the park brake.
14. Allow the machine to warm up for 2 minutes before moving. When the temperature drops below 5°C (40°F), allow 3 to 5 minutes for the machine to warm up before using.



Fig. 11 STARTING

15. Move the throttle to its maximum speed setting when starting to work.

### IMPORTANT

Always run the engine at maximum RPM to provide the most vacuum. Use the speed/direction pedal to select ground speed.

16. New operators or people who haven't operated the unit for a time should always allow time to become familiar with the machine. Select a level, open area free of obstacles and bystanders to try the controls. Practice starting, stopping, backing up and turning. Become familiar with all controls before going to work.

## 4.7 STOPPING

When stopping the machine, follow this procedure:

1. Raise the intake tube to its highest position.
2. Center the intake tube in front of the machine.
3. Gradually move the speed/direction control pedal to its neutral position. The hydrostatic motors on the drive wheels will provide dynamic braking to the unit. When necessary press down on the brake pedal to help stop the vehicle.
4. Engage the park brake.
5. Turn the vacuum control switch OFF.
6. Turn the joy stick control switch OFF.
7. Move the throttle lever down until the engine is running at low idle.
8. Turn the key counter-clockwise to shut off the engine.
9. Remove the ignition key before dismounting.

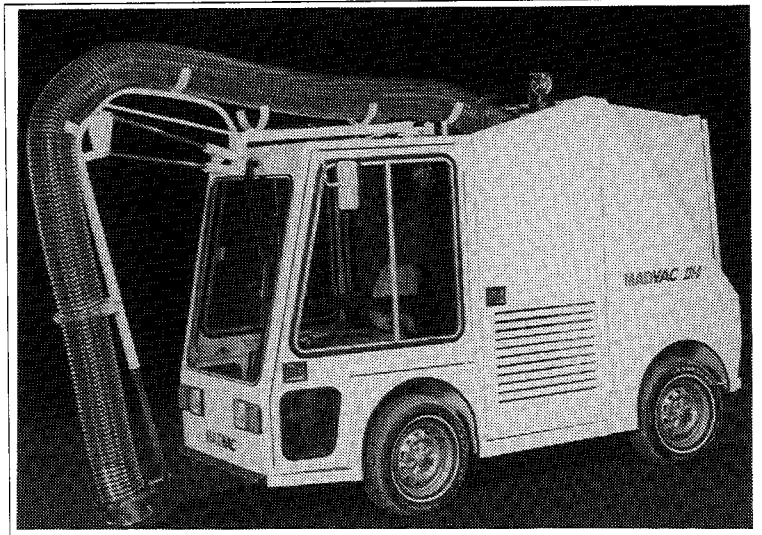


Fig. 12 STOPPING

## 4.8 OPERATING

The driver should follow this procedure when operating the machine:

1. Clear the area of bystanders.
2. Review all items on the Pre-Operation Checklist.
3. Start the machine (See Section 4.6).
4. Proceed to the working area.
5. Turn on the vacuum by depressing the rocker switch on the upper panel.
6. Turn the joy stick master switch ON.
7. Push the throttle lever forward and run the engine at full RPM.
8. Turn on the flashing beacons.
9. Raise the inlet to the desired height by depressing the left side of the rocker switch on the joy stick.
10. Move the machine into position.
11. **Gather trash:**
  - a. Use the rocker switch on the joy stick to set the inlet at an average height to reach the trash. This is normally 25 to 75 mm (1 to 3 inches from the ground).
  - b. Use the joy stick to move the inlet tube away from the machine and then move toward the trash.
  - c. Trace out a sawtooth pattern as the inlet tube is moved in an arc around the machine.

12. Trash and debris of all types can easily be picked up by the machine. Large flat objects such as paper or plastic sheets are best handled by starting at one corner and pulling the sheet into the inlet. A large folded newspaper cannot be pulled into the intake without plugging the tube. They must be picked up by hand or separated.
13. The machine can develop sufficient vacuum to draw water into the container and pick up the trash in the water. The water passes through the system and the trash remains in the container.

In wet conditions, the container must always be emptied at the end of the day to prevent the container from rusting.

In conditions where the temperature drops below freezing, empty the container and remove all the water from the fan compartment. This will eliminate ice forming around the fan and locking it in position. Normally running the fan for 3 to 5 minutes will dry the system.

14. The tight manoeuvring ability and easy direction change allows the operator to drive through or around almost any obstacles to gather trash.



## WARNING

Maintain a safe speed when making short corners or going over rough, uneven terrain.

15. Never allow riders on any part of the machine.
16. Gather trash until the container is full.
17. When the container fills, the machine will gradually lose suction. When trash can no longer be picked up, the container will have to be emptied. Refer to Section 4.9.
18. **Right Hand Exit:**  
The unit is designed to allow easy exiting through the right hand door. To exit the right door:

- a. Center inlet tube.



Fig. 13 VACUUMING TRASH

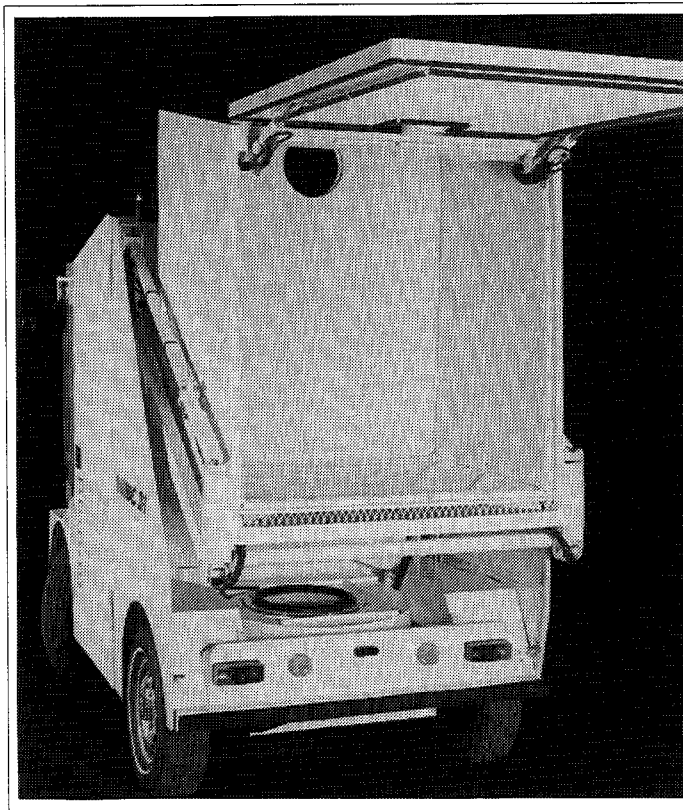


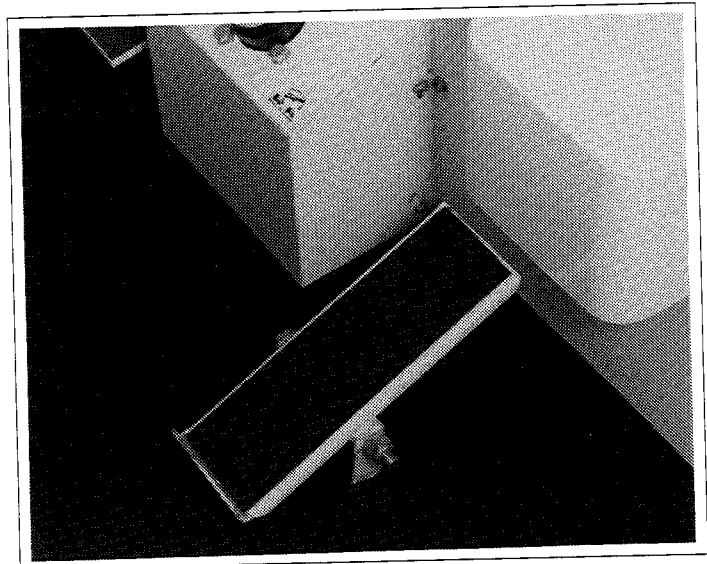
Fig. 14 EMPTYING CONTAINER



- b. Stop machine movement.
  - c. Turn joy stick OFF.
  - d. Slow engine to low idle and stop.
  - e. Engage park brake.
  - f. Release joy stick frame latch and flip back out of the way.
  - g. Secure the joy stick frame in its operating position before resuming work.
19. Always drive at a speed that is appropriate for the terrain and surroundings. Use slow speeds when going over rough terrain, in congested areas or when people are present.
20. When operating on steep inclines go up the slope or down the slope, never across it to prevent roll-over.
21. The unit can go over obstacles up to 200 mm (8 inches) such as curbs. However the operator must always approach them at right angles and at a slow speed.
22. When changing speed or direction:
- a. Slowly release the pressure on the foot pedal.
  - b. Use the dynamic braking of the hydrostatic system to slow the machine.
  - c. When the return spring centers the pedal, the unit should be stopped.
  - d. Then depress the other side of the pedal to change directions.
23. It is recommended that the shaker be run whenever the container is emptied to remove any build-up on the dust screen. Empty the dust tray under the screen as required. Daily use an air nozzle or water hose to flush out the dust screen or more often when it gets dirty.
24. For ease of use, avoid the following:
- a. Continuously raising and lowering the intake arm.



**Fig. 15 OPERATING**



**Fig. 16 SPEED/DIRECTION PEDAL**

- b. Not adjusting intake tube at adequate height from the ground. (eg. dragging on ground).



## 4.9 EMPTYING THE CONTAINER

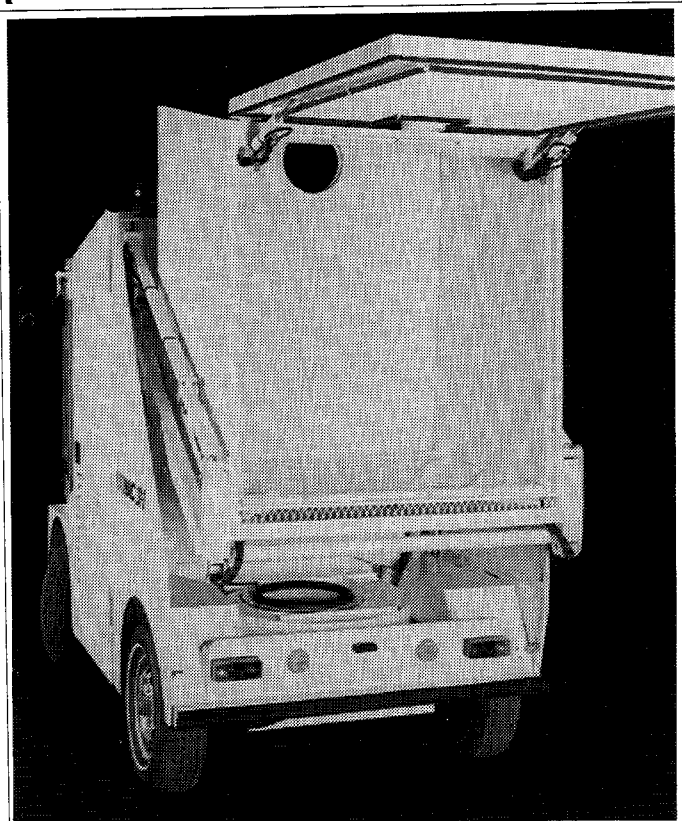
When the container is full, follow this procedure to empty:

1. As the container fills with trash, the trash will cover the bottom and sides blocking the flow of air. This will cause the unit to loose suction. When the suction is gone, empty the container.
2. Raise the inlet tube to its highest position.
3. Turn the joy stick master OFF.
4. Back or drive the machine into its unloading position.
5. Slow and stop the machine motion.

**Keep hazard flasher ON.**

6. Open the tail gate.
7. Tilt the container back to empty the trash.
8. If emptying into a bin, raise the container to its highest position before tilting.
9. When the container is empty, tilt the container forward and lower as required. Lower until the container is fully seated and the yellow light on the instrument panel has gone out.
10. Close the rear door.
11. When the container is out of its seated position, turn the shaker ON to clean the dust screen.
12. When operating in very dirty conditions, remove and empty the dust tray under the dust screen.
13. Proceed with gathering trash.
14. It is recommended that the container be emptied at the end of every day to minimize rusting of the unit. This is particularly important when operating in wet conditions.

In addition to emptying the container, all water should be removed from the fan compartment to prevent freezing if the unit is subjected to freezing temperatures over night. Normally running the unit for 3 to 5 minutes is sufficient to dry the unit.



**On The Ground**

**Fig. 17 EMPTYING TRASH**



**Fig. 18 AIR OUTLET**

### **IMPORTANT**

**It is recommended to activate the shaker regularly to maintain good air flow through the filter and not loose vacuum.**

## 4.10 TRANSPORTING



### TRANSPORT SAFETY

1. Read and understand ALL the information in the Operator's Manual regarding procedures and SAFETY when operating the MADVAC in the workplace and/or on the road.
2. Always travel at a safe speed. Use caution when making corners or meeting traffic.
3. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
4. Do not allow riders on any part of the machine during either field operation or road and highway travel.
5. Always use hazard warning flashers and the rotating beacon on the MADVAC when transporting unless prohibited by law.

When moving the machine, follow this procedure:

1. Clear the area of bystanders.
2. Clean all lights and reflectors.
3. Do not allow riders.
4. Start machine (See Section 4.6).
5. Turn hazard flashers and beacon ON.
6. Raise to its highest position and center inlet tube.
7. Turn the joy stick OFF.
8. Be sure vacuum fan is OFF.
9. Use special care when transporting during times of limited visibility. Be sure that you can be seen by oncoming and overtaking traffic.
10. Never exceed the speed appropriate for the terrain and conditions. Slow down for turns and when traveling over rough terrain.



Fig. 19 TRANSPORTING

11. Open dump valve on the top of the hydraulic pump should it be necessary to tow the unit.

## 4.11 STORAGE

There are special procedures to follow when placing the MADVAC into storage or preparing to use it again.

### 4.11.1 PLACING IN STORAGE

After the season's use, inspect all the major systems and components of the machine. Repair or replace all damaged or worn parts at this time to prevent any unnecessary delays at the start of next season.

1. Service and lubricate the machine per the schedule given in the Maintenance Section.
2. Inspect the engine compartment and container. Remove any trash or debris from those areas.
3. Open the container and tilt it back.
4. Remove the dust tray.
5. Wash the machine, container and dust screen thoroughly with a hose or pressure washer. Be sure to remove all mud, trash and debris to prevent rusting of the underlying parts.
6. Allow the container to drain.
7. Place container in its operating position and run the fan for 3 to 5 minutes to dry the system.
8. Install and secure the dust pan.
9. Check the condition of all hydraulic lines, hoses and fittings. Replace any damaged or worn components. Be sure to eliminate all leaks.
10. Touch up all paint chips and nicks to prevent rusting. Use a rust preventative paint for the inside of the container and the fan compartment. This paint is available by the can or in a spray bomb.
11. Remove the battery, and store it in a cool, dry area on wooden blocks or a wooden pallet. Charge it monthly to maintain an adequate charge.
12. Check engine coolant concentration, if too low water could freeze and damage the engine.
13. Store the machine inside a building to protect it from the elements. If it cannot be stored inside a building, cover it with a waterproof tarpaulin and tie it down securely.
14. Store the machine away from area of human activity. Do not allow children to play on or around the machine.
15. Block the wheels if stored for a long period of time.

### 4.11.2 REMOVING FROM STORAGE

When preparing to use the machine at the start of the season, follow this procedure:

1. Remove the tarpaulin.
2. Charge the battery to its specified level and install.
3. Review all items on the Pre-Operation Checklist.
4. Check all fluid levels and top up as required.
5. Check the tire pressure and bring to specified pressure.

## 5 SERVICE AND MAINTENANCE



### MAINTENANCE SAFETY

1. Review the Operator's Manual and all safety items before working with, maintaining or operating the MADVAC.
2. Place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Follow good shop practices:  
Keep service area clean and dry. Be sure electrical outlets and tools are properly grounded. Use adequate light for the job at hand.
4. Before applying pressure to hydraulic system make sure that all connections are tight and that all hoses and fittings are in good condition.
5. Keep hands, feet, clothing and hair away from all moving and/or rotating parts.
6. Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments or emptying.
7. Do not attempt any adjustment or maintenance to any system of the Vacuum when the machine is in motion.
8. Make sure that all guards and shields are properly installed and secured before operating the Vacuum.
9. Securely support the container using the lift cylinders safety stoppers before working beneath it or attempting any adjustment or maintenance to any part with the container in the raised position.
10. Securely support the machine using blocks or safety stands before working beneath it or changing tires.
11. Store and transfer fuel, solvents, cleaners or any flammable liquids only in safety standard approved containers.

## 5.1 SERVICE

### 5.1.1 FLUIDS AND LUBRICANTS

1. Grease  
Use an SAE multi-purpose high temperature grease or a multi-purpose lithium base grease.
2. Diesel Fuel  
Use Grade No. 2 fuel, as defined by ASTM Designation D975 for Diesel fuels. When operating in cold ambient temperatures, the use of a mixture of No. 1 and No. 2 is permitted for a short period of time.

#### Fuel Specifications:

Sulfur Content: Less than 1% by weight, preferably less than 0.5%.

Cloud Point: At least 10°F below lowest expected ambient temperature.

Water and Sediment: Less than 0.1% by weight.

Cetane Number: 40 minimum. In cold weather or high altitudes, 45 to 55 is desirable.

Viscosity: Over 1.3 centistokes at all times to provide adequate lubrication to the fuel system.

Fuel Tank Capacity: 16 U.S. gal (60 liters)

### 3. Hydraulic Fluid

Use an ISO 36 grade oil in the hydraulic oil reservoir for most working conditions. Use a lighter grade oil for lower temperatures.

Tank Capacity: 16 gal (60 liters).

### 4. Coolant:

Use a 50:50 mixture of a good commercial grade ethylene-glycol base antifreeze that meets the chemical composition of GM 6038-M. This mixture should be used down to an ambient temperature of -37°C (-34°F). Use 60:40 mixture for temperatures down to -54°C (-65°F). Do not use oil base or alcohol base antifreezes.

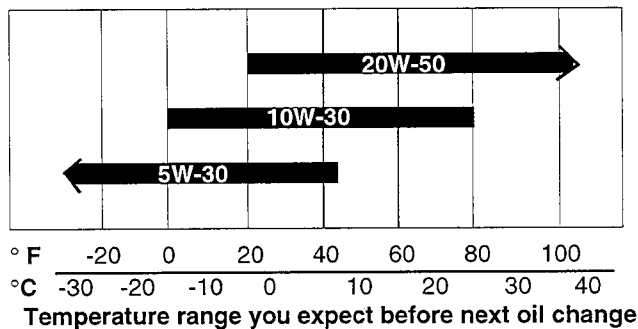
Coolant Capacity: 1.0 gal (4.0 liters).

### 5. Engine Oil:

Use a SAE 10W30 multi-viscosity oil meeting the American Petroleum Institute (API) Classification of CC/CD/CE for most operating conditions. Consult engine manual for unusual operating temperature. Do not mix oil types or viscosities.

Crankcase Capacity: 1.6 U.S. gal (6.0 Liters).

Use these SAE Viscosity Grades



## 5.1.2 GREASING

Refer to section 5.1.1 for recommended grease. Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

1. Use only a hand-held grease gun for all greasing. An air-powered greasing system can damage the seals on bearings and lead to early failures.
2. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
3. Replace and repair broken fittings immediately.
4. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passage. Replace fitting if necessary.

### 6. Storing Lubricants and Fluids

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all fluids. Store them in an area protected from dust, moisture and other contaminants.

### 5.1.3 SERVICING INTERVALS

#### Daily or 8 Hours

1. Check engine oil level.



## WARNING

Machine is shown with engine compartment door open for illustrative purposes only. Never operate with door open.

2. Check coolant level.
3. Check Oil level in Brake fluid reservoir.

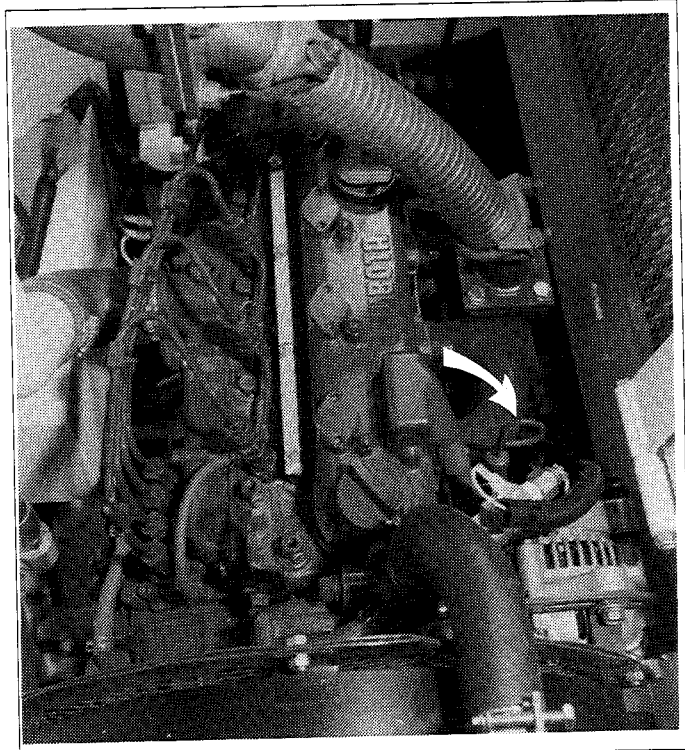


Fig. 20 DIPSTICK

4. Check fuel level. Add as required.

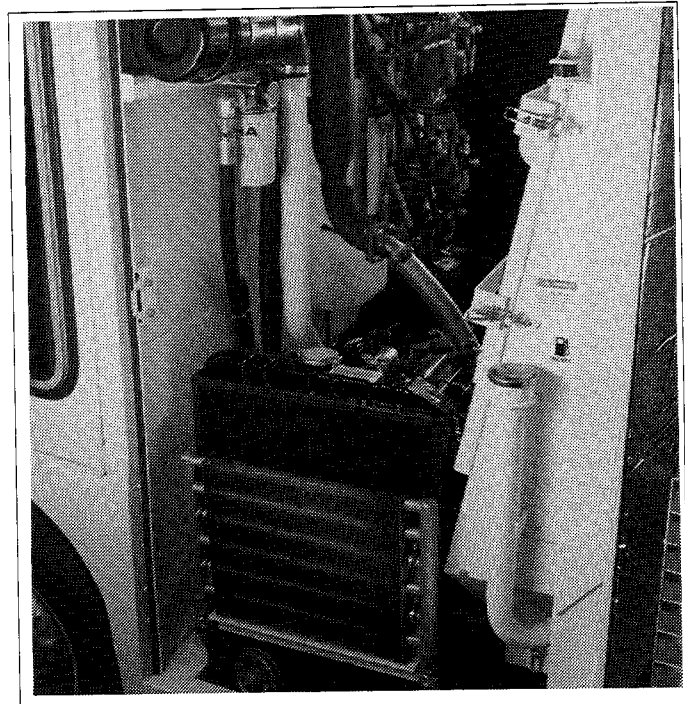
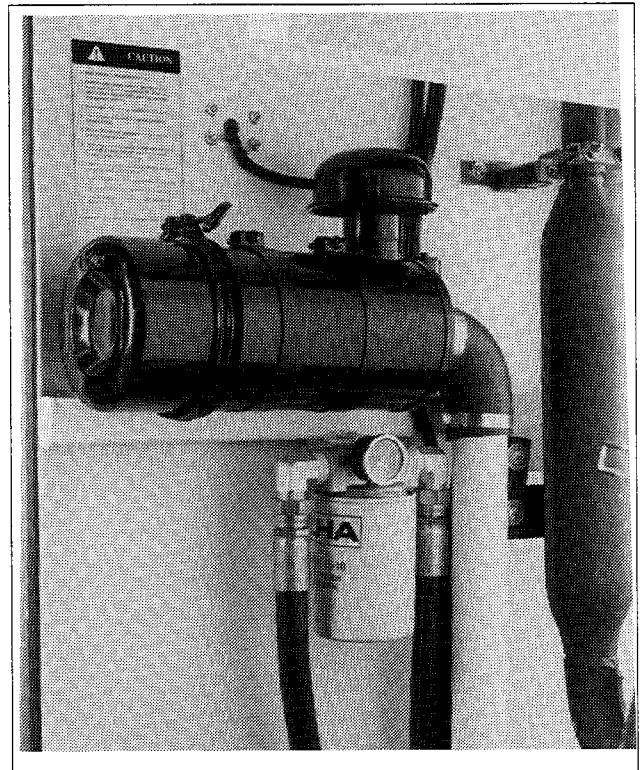


Fig. 21 FUEL TANK

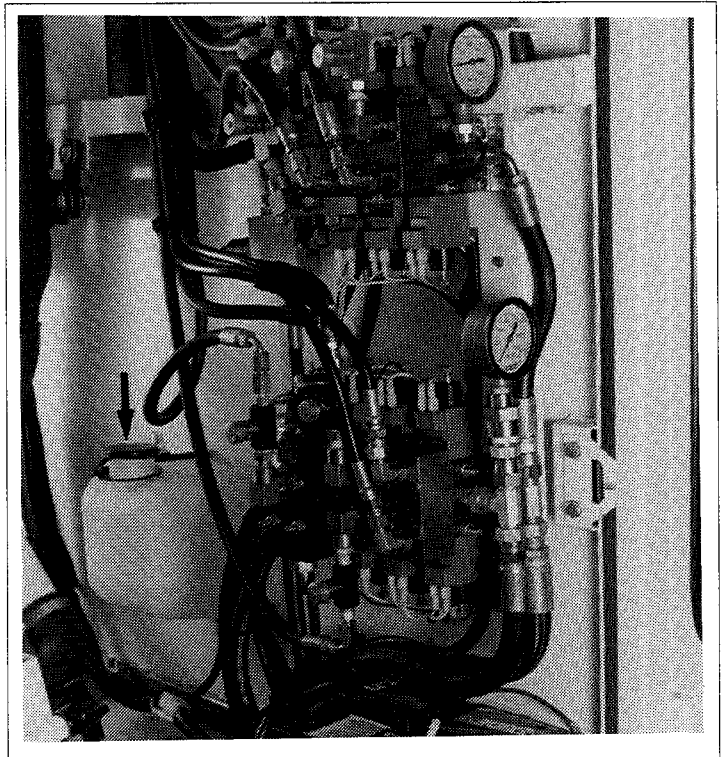
### Daily or 8 Hours (cont'd)

5. Clean the engine air filter cannister cover. Check air restriction indicator. Blow out filter only if indicator is in the red. (Refer to Section 5.2.3 of the manual).
6. Clean the vacuum exhaust filter. (Refer to Section 5.2.9 of the manual).



**Fig. 22 AIR FILTER CANNISTER**

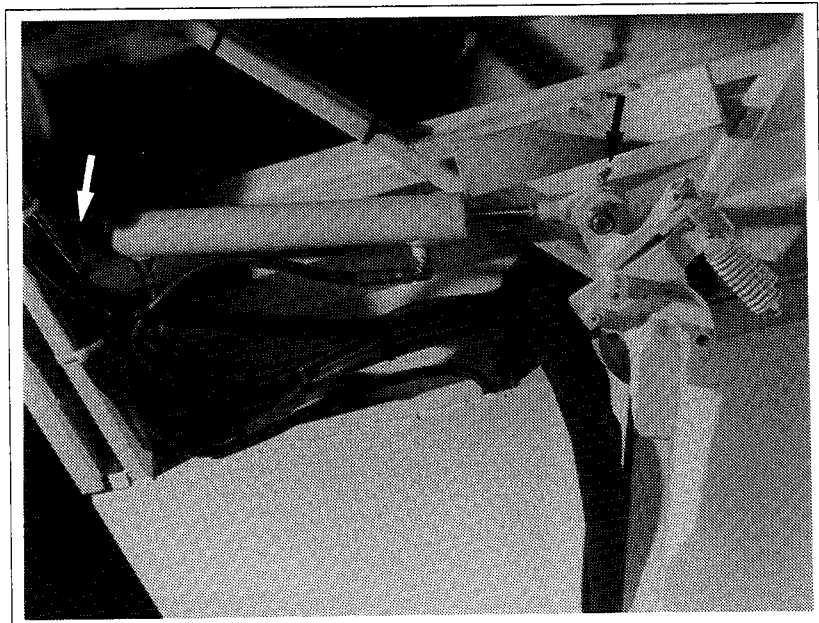
7. Check windshield washer fluid. Top up as required.



**Fig. 23 WINDSHIELD WASHER FLUID**

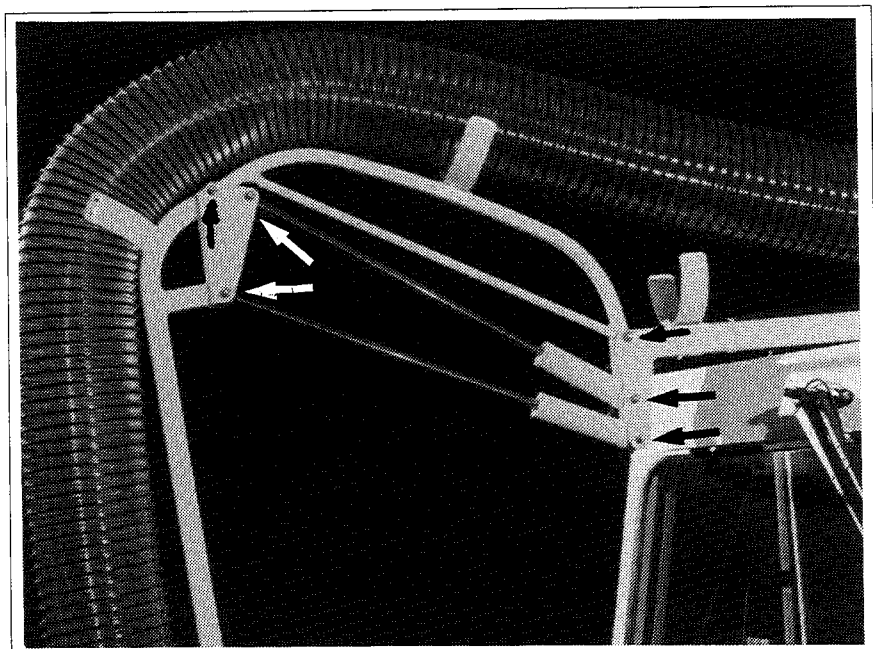
## 100 Hours or Weekly

1. Grease inlet arm swing cylinder pivot points (2 locations).  
Grease rotation arm lever shoulder bolt (1 location)



**Fig. 24 INLET ARM SWING PIVOTS**

2. Grease inlet tube up/down and in/out cylinder pivot points (4 locations).  
Intermediate arm pivot points (2 locations).



**Fig. 25 INLET ARM POSITION PIVOTS**



### 100 Hours or Weekly (cont'd)

3. Grease front wheel steering linkage and lower ball joint (2 locations each side).
4. Grease front wheel suspension system pivots (1 location each side).

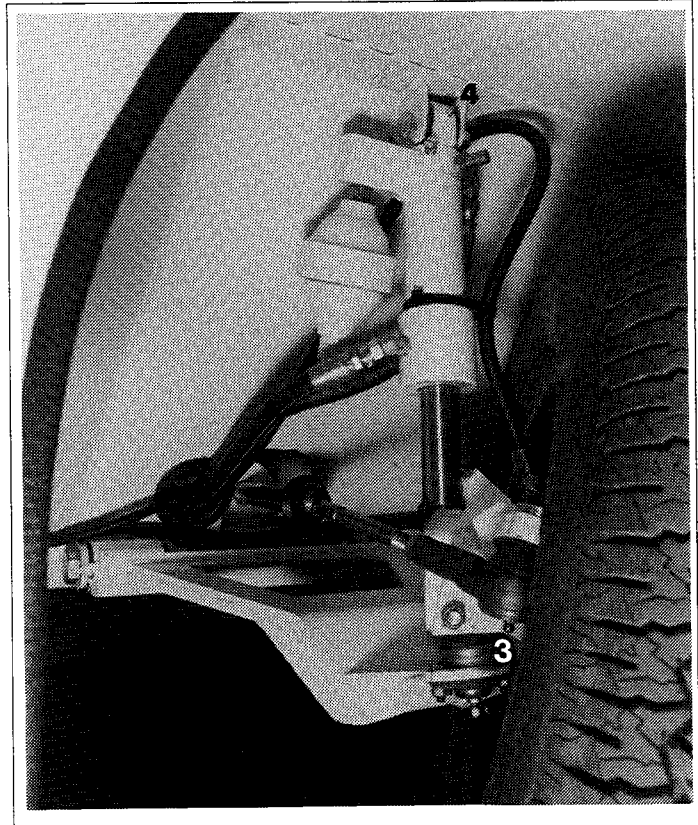


Fig. 26 FRONT WHEEL

5. Grease rear wheel suspension system pivots (2 locations each wheel).

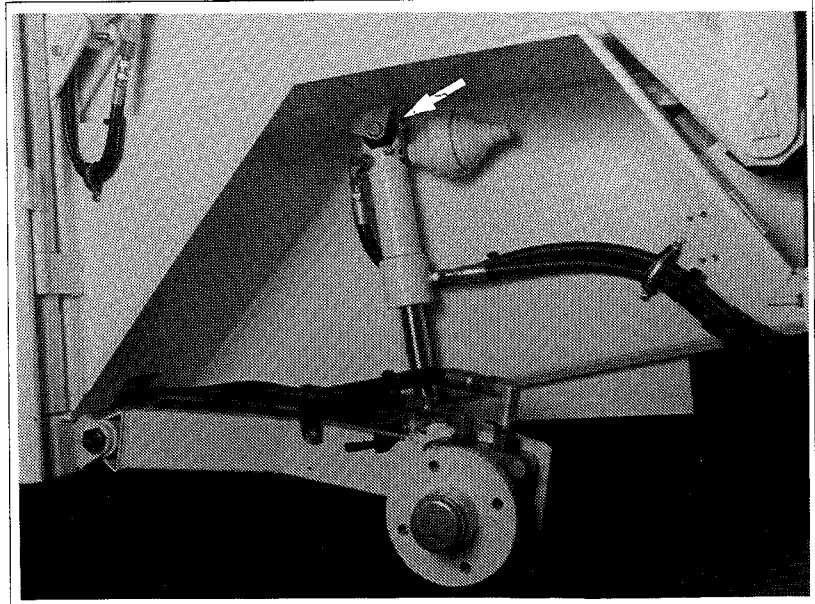


Fig. 27 REAR WHEEL SUSPENSION PIVOTS

**100 Hours or Weekly (cont'd)**

6. Grease container tilt and raise cylinder pivots (6 locations each side).

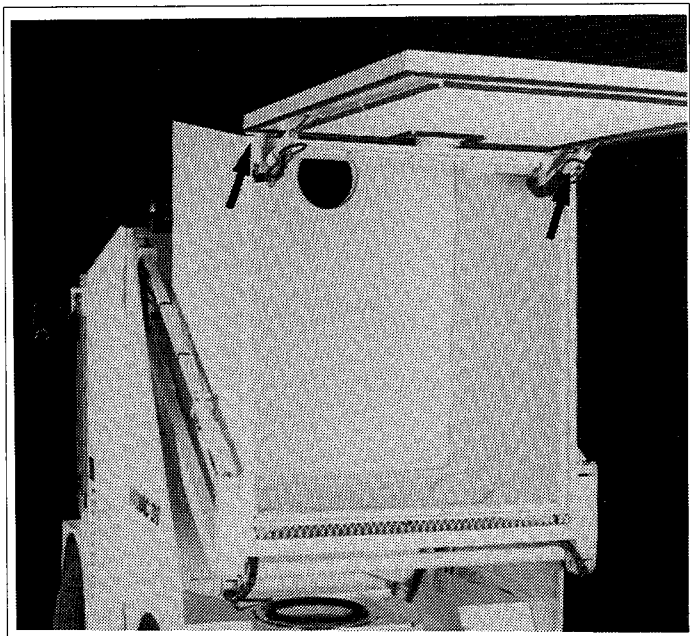


**Fig. 28 CONTAINER TILT AND RAISE PIVOTS**

7. Grease container door cylinder pivots (2 locations each side).

8. Grease container door hinges (1 location each side).

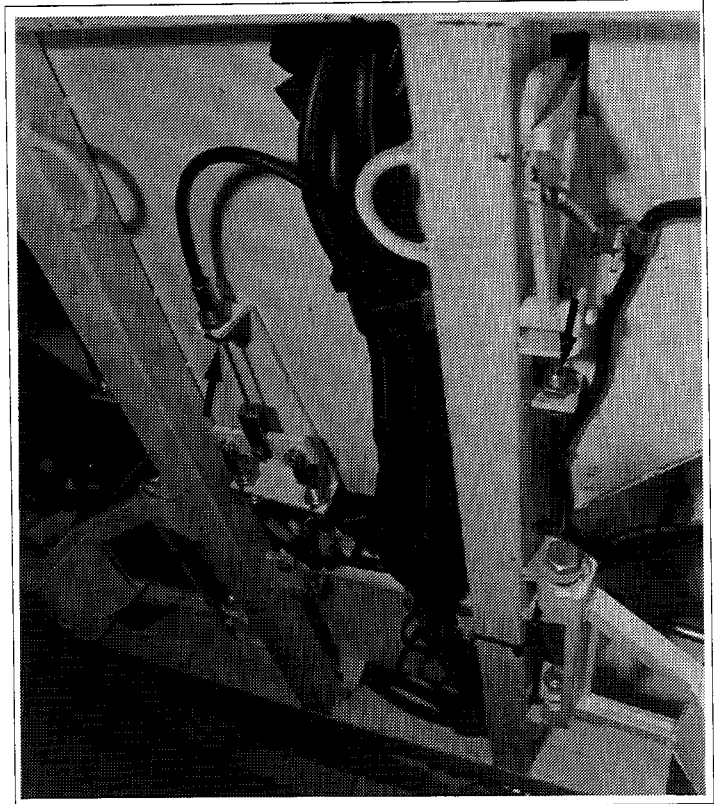
Grease vehicle doors hinges  
(12 locations)



**Fig. 29 CONTAINER DOOR PIVOTS**

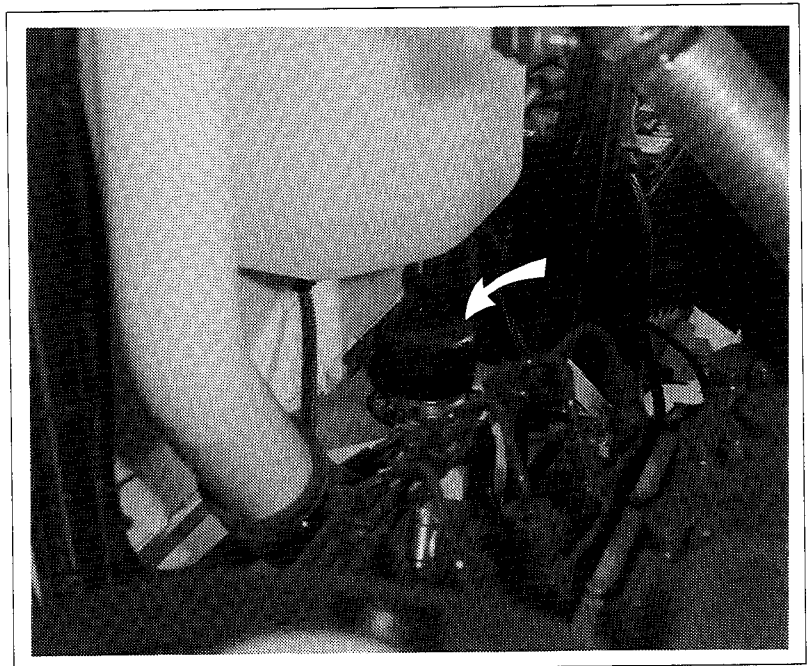
### 100 Hours or Weekly (cont'd)

9. Lubricate control cables. Use WD40 or a light weight oil.



**Fig. 30 CONTROL CABLES**

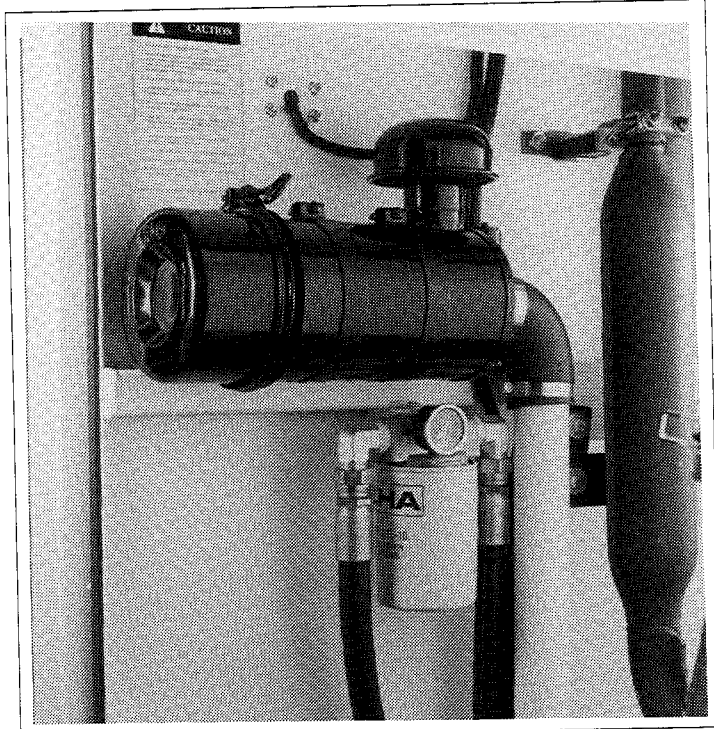
10. Check oil level in hydraulic reservoir. The oil line should be seen between the two lines on the dipstick located inside the oil filler cap. Do not overfill.



**Fig. 31 HYDRAULIC RESERVOIR**

### 100 Hours or Weekly (cont'd)

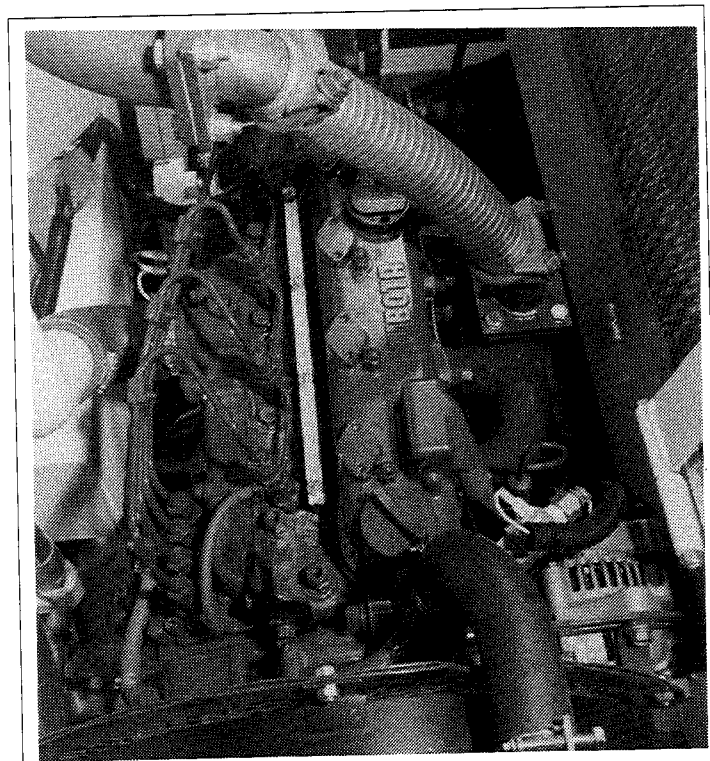
11. Check engine air filter. Clean or replace as required. (Refer to Section 5.2.3 of the manual).



**Fig. 32 ENGINE AIR FILTER**

### 100 Hours

1. Change engine oil. (Refer to Engine manual).
2. Change engine oil filter. (Refer to Engine manual).



**Fig. 33 FUEL FILTER**

## 250 Hours

1. Change return filter on hydraulic system.

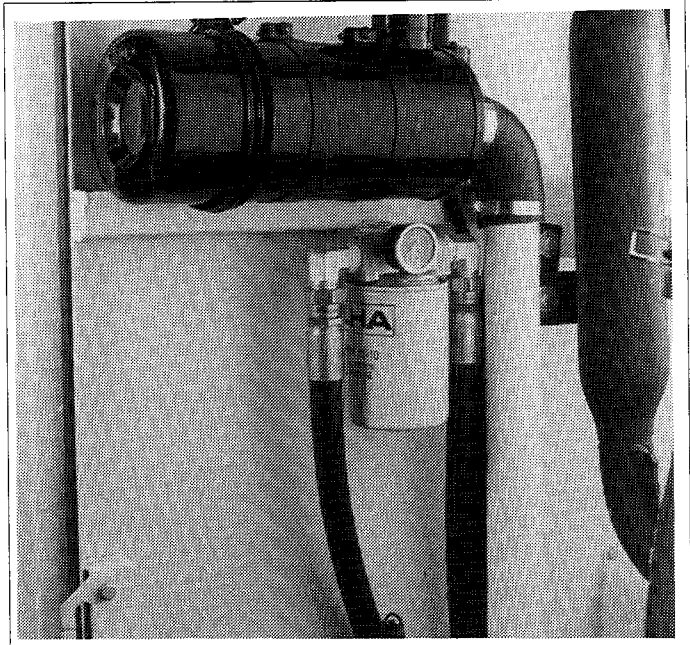


Fig. 34 HYDRAULIC FILTER

2. Clean engine and compartment.
3. Change fuel filter. (Refer to Engine manual)

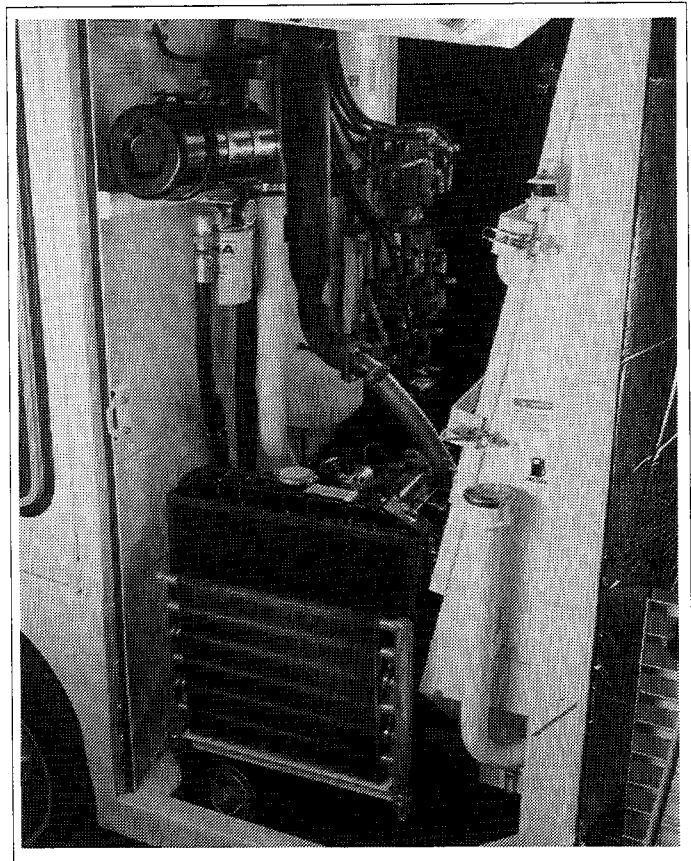
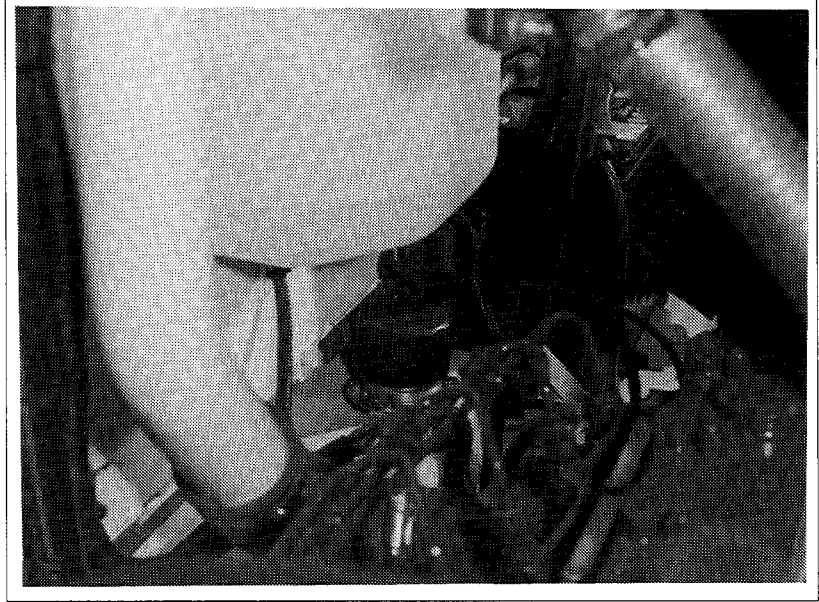


Fig. 35 ENGINE COMPARTMENT

**500 Hours or Annually**

1. Change oil in hydraulic sytem.



**Fig. 36 HYDRAULIC TANK**

2. Remove and clean hydraulic suction strainer.

#### 5.1.4 SERVICE RECORD FOR THE 231D DIESEL

See Lubrication and Maintenance sections for details of service. Copy this page to continue record.

ACTION CODE:	✓	CHECK	C	CHANGE	CL	CLEAN
	L	LUBRICATE	RE	REMOVE		

<div> <div>HOURS SERVICED BY</div> <div>MAINTENANCE</div> </div>												
	8 Hours or Daily											
√ Engine Oil Level												
√ Coolant Level												
√ Fuel Level												
√ Windshield Washer Fluid												
√ Brake Fluid Level												
CL Engine Air Filter Cannister												
CL Vacuum Exhaust Filter Screen												
100 Hours or Weekly												
√ Oil Level in Hyd. Reservoir												
L Inlet Arm Swing Cylinder Points (2)												
L Inlet Tube Cylinder Points (6)												
L Front Wheel Steering Linkage (4)												
L Front Wheel Suspension (2)												
L Rear Wheel Suspension (4)												
L Container Tilt & Cylinder Pivots (12)												
L Container Door & Cylinder (6)												
L Control Cables & vehicle doors(12)												
√ Engine Air Filter												
CL Engine And Compartment												
100 Hours												
C Engine Oil												
C Engine Oil Filter												
250 Hours												
C Fuel Filter												
C Return Filter on Hydraulic System												
500 Hours												
C Oil In Hydraulic System												
RE + CL Hydraulic Suction Strainer												

**NOTE** Replacement of the air filter should be made when the restriction indicator turn to red. For details on the replacement, see Section 5.2.3.



## 5.2 MAINTENANCE

### 5.2.1 ENGINE OIL AND FILTER CHANGING

1. Review the Operator's Manual for the engine.
2. Allow the engine to cool before changing oil. Hot oil can cause burns if it contacts exposed skin.
3. Be sure the ignition key is removed.
4. Place a pan under the drain plug.
5. Remove the drain plug and allow oil to drain for 10 minutes.
6. Use a band filter removal tool to remove the engine oil filter.
7. Coat the oil filter gasket with oil before installing.
8. Tighten by hand until the filter is snug. Then tighten an additional 1/2 turn to seal. Do not overtighten.

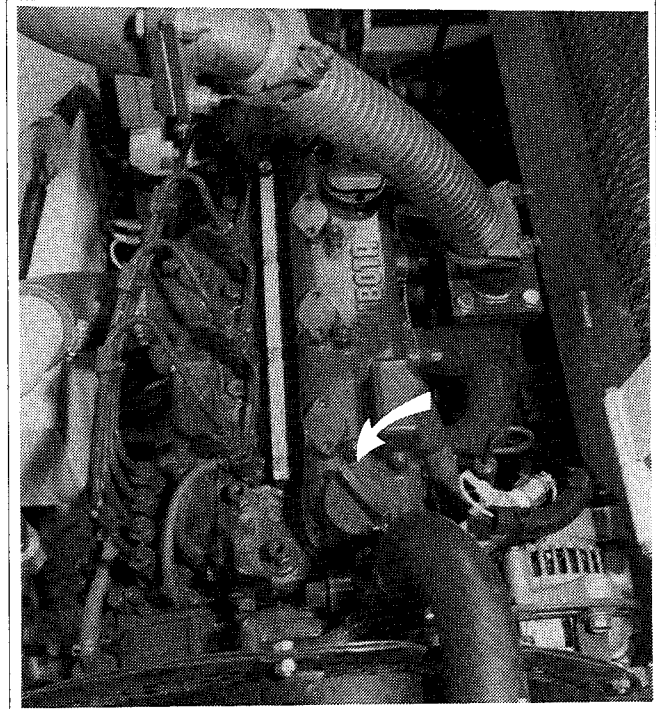


Fig. 37 ENGINE FILL CAP

9. Install the engine drain plug.
10. Dispose of the oil in an approved container.
11. Add 6 liter (6 qt. U.S.) of SAE 10W30 or 10W40 motor oil.
12. Run the engine for 1 minute and check for leaks.
13. If leaks are found around the filter, tighten slightly and repeat Step 12.
14. Check engine oil level. Top up as required.

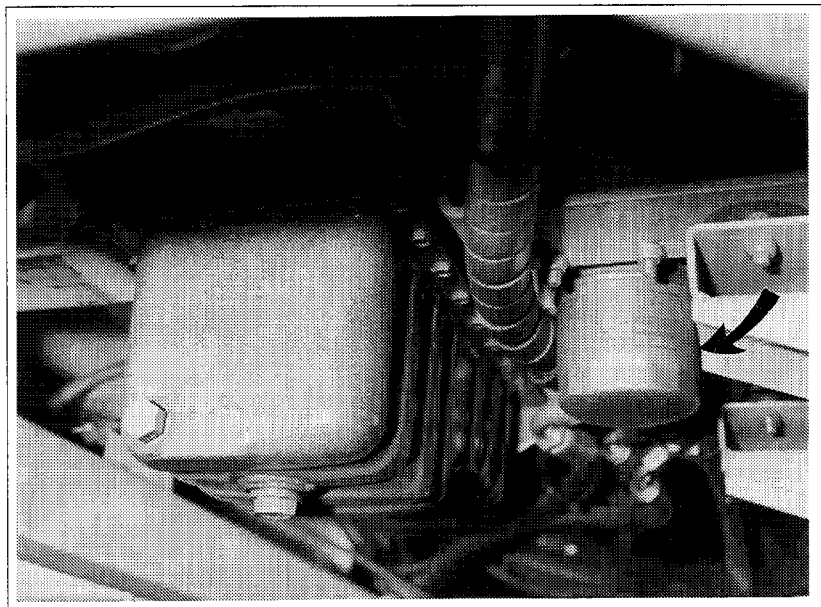


Fig. 38 ENGINE OIL FILTER



## 5.2.2 FUEL FILTER

The inline fuel filter located between the tank and the engine should be changed every 250 hours or more frequently if required. Be sure the machine has cooled before replacing.

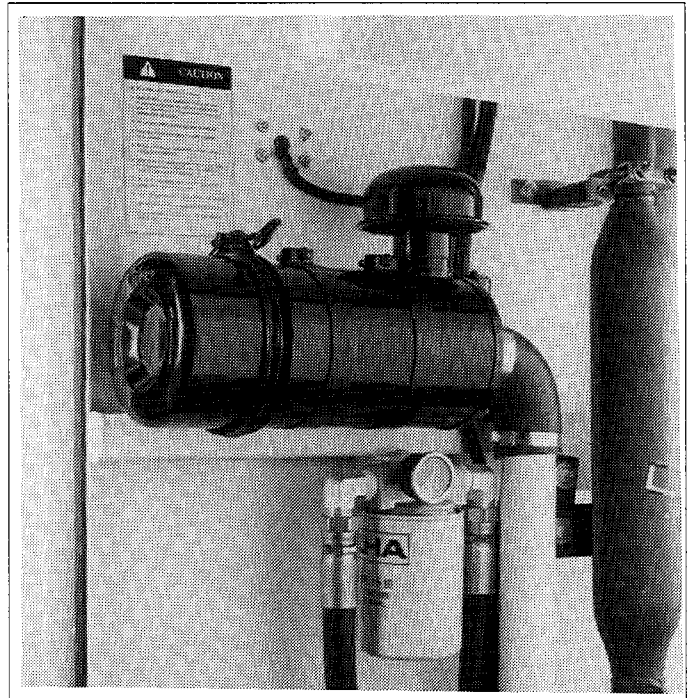
Use a band filter removal tool to remove the engine fuel filter. Apply fuel oil thinly over the gasket and tighten the cartridge into position hand-tight. Finally vent the air (refer to engine operator manual for more details).

## 5.2.3 AIR CLEANER MAINTENANCE

The air intake system consists of a cannister with an engine filter element inside. Cleaning of this element should only be done when the element is dirty and the air restriction indicator is in the red to prevent damage to the filter or seals. When the inner element gets dirty, replace it.

Follow this procedure when maintaining the air cleaner.

1. Clear the area of bystanders.
2. Place all controls in neutral, stop the engine, set park brake, remove the ignition key and wait for all moving parts to stop before dismounting.
3. On a daily basis before starting, open the cannister cover and remove any dirt in the cover.
4. Clean the element **ONLY** when the air restriction indicator is in the red.
5. To clean, remove the cover on the cannister.
6. Remove the wing nut holding the filter in place.
7. Carefully slide the filter out of the cannister.
8. Apply compressed air into the body from the inside with at least one inch clearance between the filter element and the air nozzle. Do not exceed 100 psi (7 kg/cm<sup>2</sup>) air pressure.
9. If the element is heavily caked with dirt, submerge in an element cleaning solution for 30 minutes. Rinse with clean water and allow to dry for 24 hours.
10. Place a light source inside the element and check for pin hole leaks.
11. If the element or seals are damaged or the paper has a pin hole leak, replace the filter.
12. Clean the inside of the cannister.
13. Check all the air intake system connections. Tighten any loose connections.
14. Install the filter in the cannister. Be sure the seals are seated.
15. Close and secure the cannister cover.
16. Reset the restriction indicator.



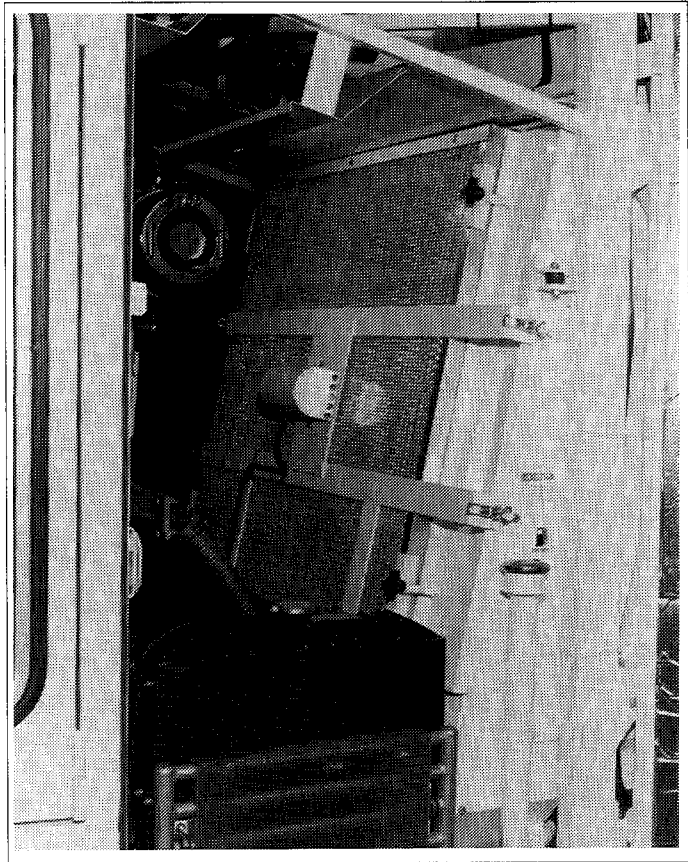
**Fig. 39 AIR FILTER CANNISTER**

## 5.2.4 CLEANING ENGINE AND COMPARTMENT

Dirt, dust and trash can build up in the engine compartment. Use a high-pressure air hose to keep the engine and compartment clean. Clean the air intake louvres as required to insure that a free flow of outside air is maintained to the engine. Blow out the compartment monthly or more often if operating in very dirty conditions.

If the unit runs hot or overheats, use a pressure washer to clean the radiator, oil cooler and specifically the space between the cooler and the radiator. This will provide unrestricted air flow and will lower the engine temperature.

A clean engine runs better, stays cool and eliminates the chance of fire.



**Fig. 40 ENGINE COMPARTMENT**

## 5.2.5 HYDRAULIC OIL FILTER CHANGING

There are 3 hydraulic circuits on the machine. A variable displacement piston pump is bolted to the output end of the engine and provides fluid power to the motors on the rear wheels of the unit. A pressure compensated variable displacement piston pump is attached to the hydrostatic pump. It provides power to the arm and the container hydraulic systems. Schematics are shown in Section 7.

The suction strainers, filter the oil before it goes to the piston pumps. All oil is routed through the return filter.

The return filter should be changed every 250 hours. To change filters, follow this procedure:

1. Open the engine compartment door.  
  
Allow oil to cool off before changing filter. Hot oil can cause burns.
2. Place a collector pan below the filter to catch any spilled oil.
3. Use a banded filter removal tool to loosen and remove the filter.
4. Dip your finger in oil and wet the rubber seal on the top of the new filter to aid in sealing.

### NOTE

Always use genuine MADVAC replacement parts to insure proper oil filtration.

5. Install the replacement filter.
6. Hand tighten until the filter is seated. Then tighten the canister another 1/2 turn using a banded filter tool. Do not overtighten.
7. Start the engine and check for leaks. Stop the engine and tighten the filter slightly if there are any leaks.
8. Check the oil level in the reservoir and top up as required.

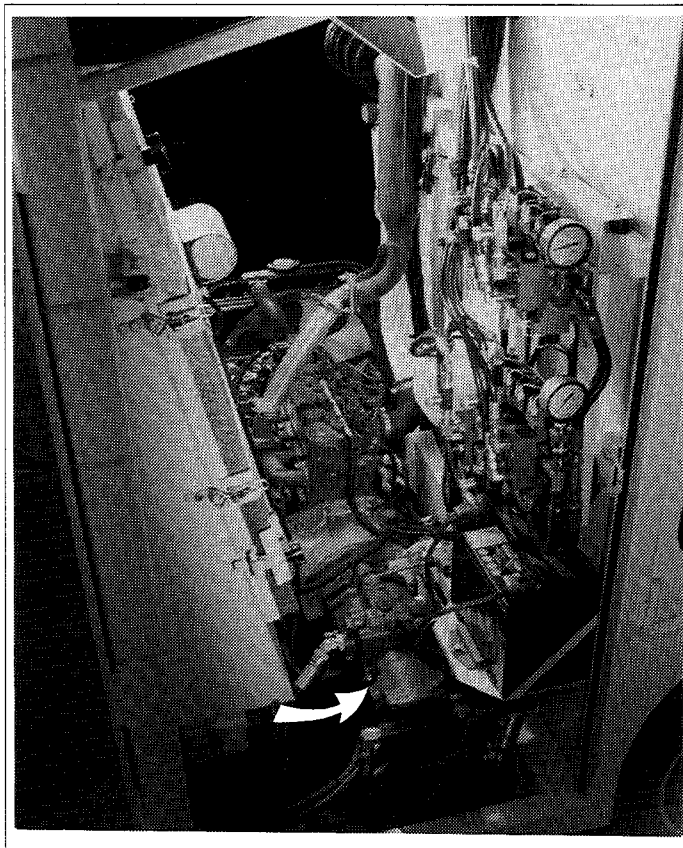


Fig. 41 HYDRAULIC PUMPS

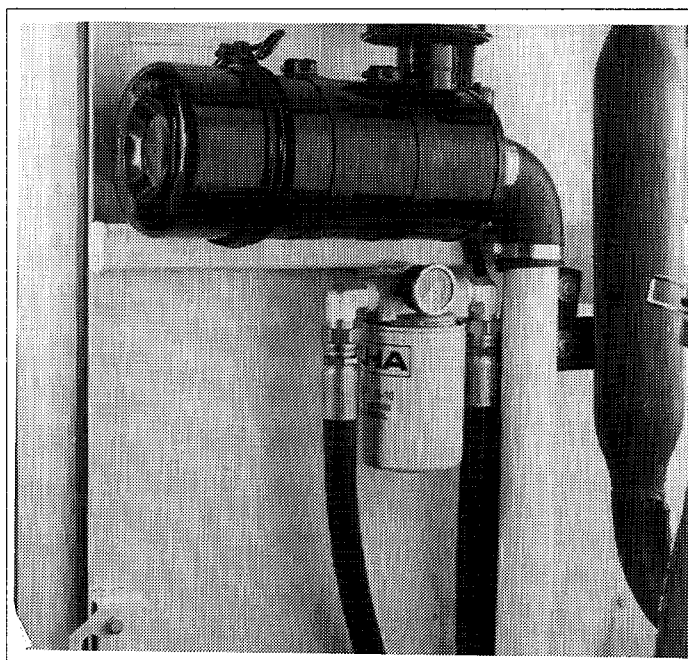
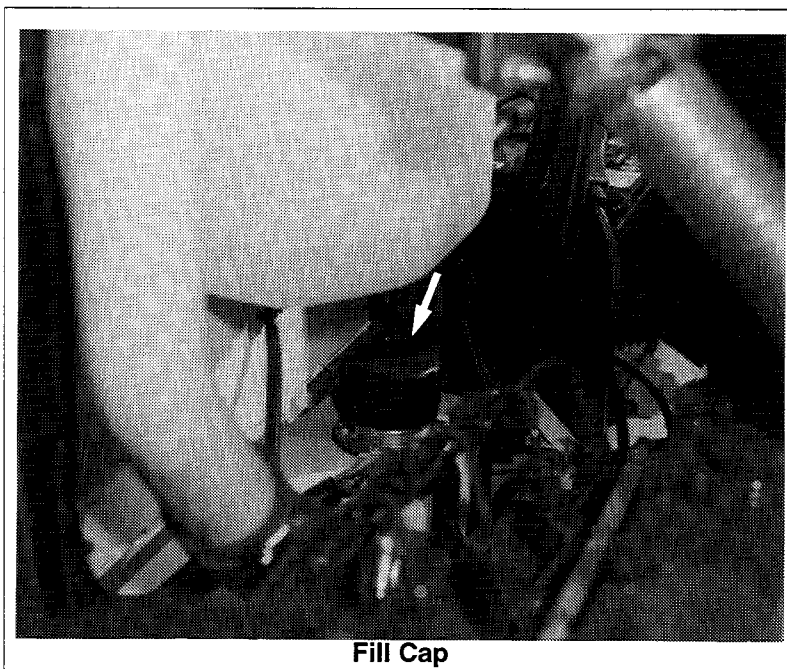


Fig. 42 HYDRAULIC OIL FILTER

## 5.2.6 CHANGING HYDRAULIC OIL

Every 500 operating hours or every 2 years, whichever comes first, the oil in the hydraulic system should be changed. To change oil, follow this procedure:

1. Stop the engine and allow the system to cool.
2. Place a container under the drain plug. More than one container may be required since the tank holds 60 liters (16 gal. U.S.).
3. Remove the drain plug and allow the system to drain for 10 minutes.
4. Replace the hydraulic filters using section 5.2.5 as a guide.
5. Remove, clean and replace hydraulic suction strainers.
6. Install the drain plug using teflon tape or pipe sealant compound and fill the reservoir with A ISO 36 hydraulic oil. System capacity approximately 50 liters (16 gal U.S.). Fill to oil level indicator. Do not overfill.
7. Start the engine and run for 3 minutes. Operate all systems to purge the lines of air and to check for leaks.
8. Check the oil level in the reservoir and top up as required.



**Fig. 43 HYDRAULIC SYSTEM**

## 5.2.7 CONTROL CABLE LUBRICATION

The control cables should be lubricated every 100 hours using WD40 or a light oil.

Put a couple of drops of light oil or a couple of short bursts of WD40 into the end of cable sheath to lubricate the cable. This is particularly important in wet, cold conditions to minimize the possibility of freezing.



**Fig. 44 CABLES**

## 5.2.8 HYDRAULIC SYSTEM TESTING

### Hydrostatic system

Flow (max.)	15 GPM
PSI (max.)	3200 PSI
Built-in relief	4000 PSI

### Hydraulic system

#### a. To fan & container

Flow	variable
PSI	2450 PSI
Relief valve setting	2500 PSI

#### b. To power steering

Flow	3 GPM
PSI	850 PSI
Relief valve	850 PSI

#### c. To intake arm

Flow	adjustable
PSI	850 PSI

### NOTE

All measurements should be taken at maximum rated engine RPM, and with hot unit.

## 5.2.9 CLEANING DUST SCREEN

All exhaust air is routed through a filter and screen in the rear wall of the engine compartment. After prolonged use, the filter can fill with dirt and restrict the air flow through the system. Although the screen and filter are equipped with a shaker for cleaning, it is recommended that the filter be washed weekly or more often if required. To clean the filter, follow this procedure:

1. Place all controls in the OFF position, stop engine, set park brake, remove ignition key and wait for all moving parts to stop.
2. Open engine compartment doors.
3. Remove dust tray from the bottom of the screen to allow the water to escape.
4. Use air to blow out most of the dust then, use a water hose or pressure washer to wash the dust filter.
5. Open the screen frame and wash the inside of the housing and the baffle.
6. Clean and wash the fan and the fan casing
7. Allow the system to drain.
8. Start the machine and run the fan for several minutes to dry the system.
9. Install and secure the dust tray.



Fig. 45 DUST SCREEN CLEANING

## 5.3 ADJUSTMENTS

### 5.3.1 INTAKE TUBE SPEED

The intake arm movement rates can be adjusted to suit the needs of the application. All hydraulic circuits are routed through the control block located at the right side of the engine compartment.

The adjusting knobs are very sensitive. Adjust the knobs in increments of 1/8 turn until the speed is at the desired rate. Adjust to suit the comfort range of the operator.

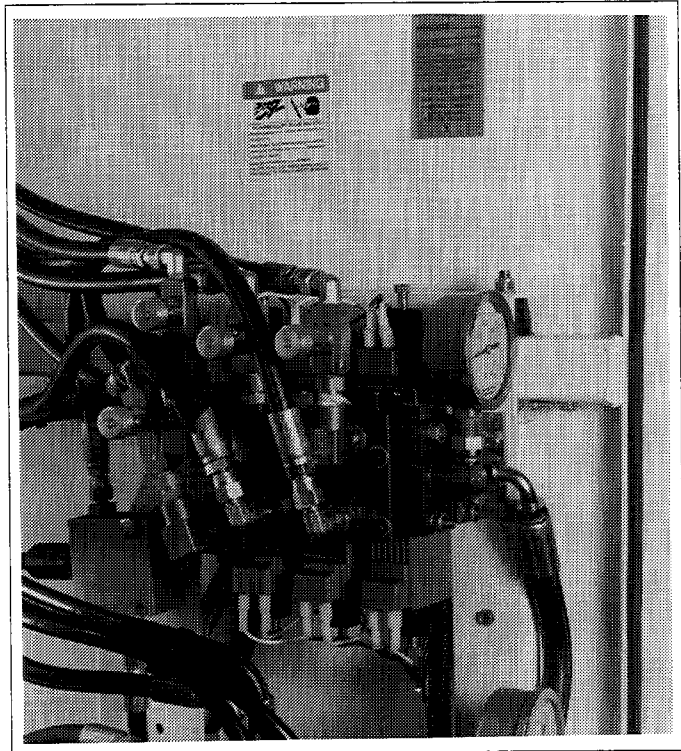


Fig. 46 INTAKE TUBE SPEED KNOBS

### 5.3.2 ELECTRICAL SYSTEM

All the fuses for the electrical circuit are located at the right end of the control panel. Schematic is in Section 8.

When one of the electrical systems does not work, always check the fuses to see if one is blown. Always replace it with a fuse of the same rating. If fuses blow repeatedly, check the system to determine the cause and rectify it.

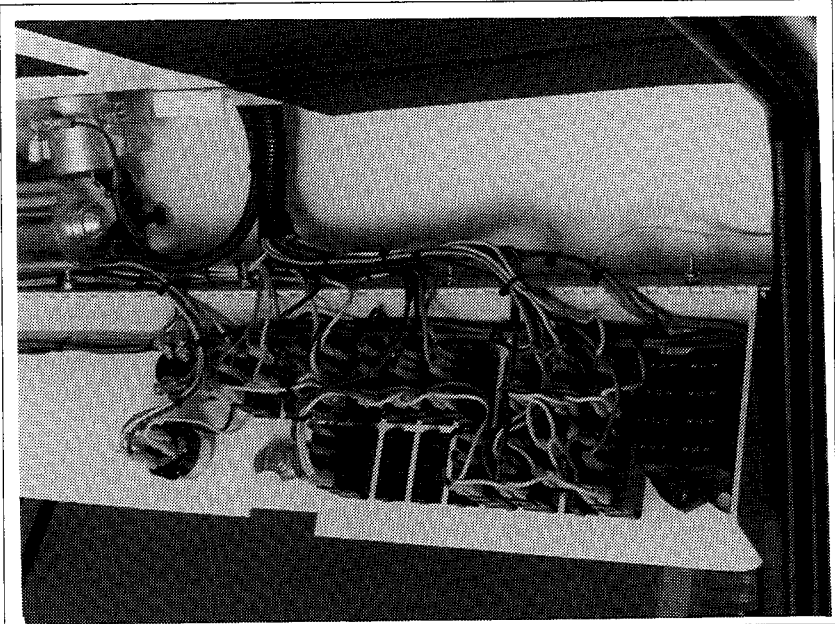


Fig. 47 ELECTRICAL FUSE PANEL



### 5.3.3 PEDAL ANGLE ADJUSTMENT

The speed/direction control pedal, operated with the right foot, is set at the factory in the middle of its adjustment range. The pedal angle can be adjusted to provide the most comfortable setting for the operator. To adjust the pedal angle, follow this procedure:

1. Stop the engine, place all controls in the OFF position, set park brake, remove ignition key and wait for all moving parts to stop.
2. Place blocks or a safety stand under the frame when working beneath the machine.
3. Loosen the jam nuts on the cable sheath. Use the jam nuts to adjust the sheath to the desired setting.
4. Tighten the jam nuts.
5. Remove the blocks or safety stand.

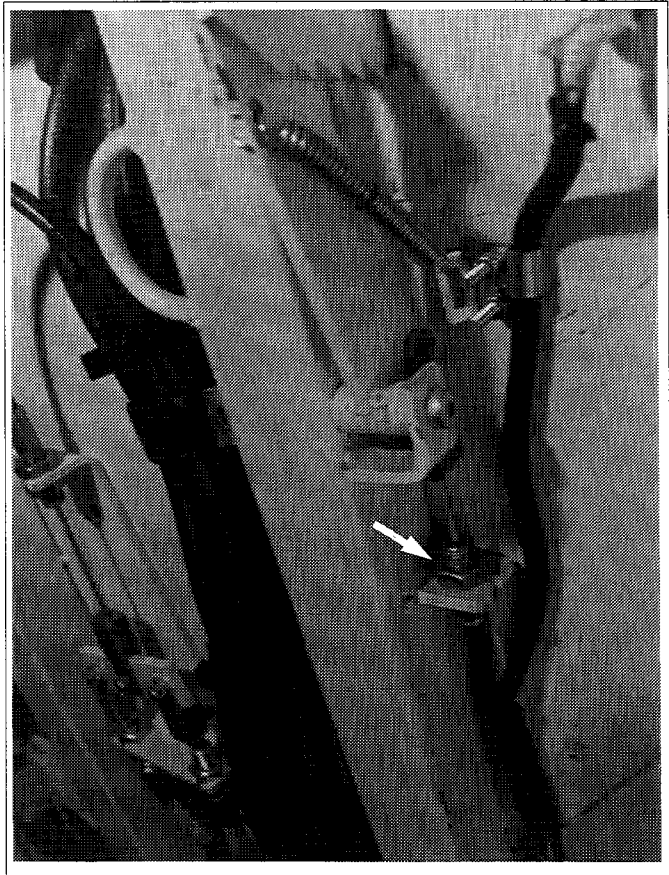


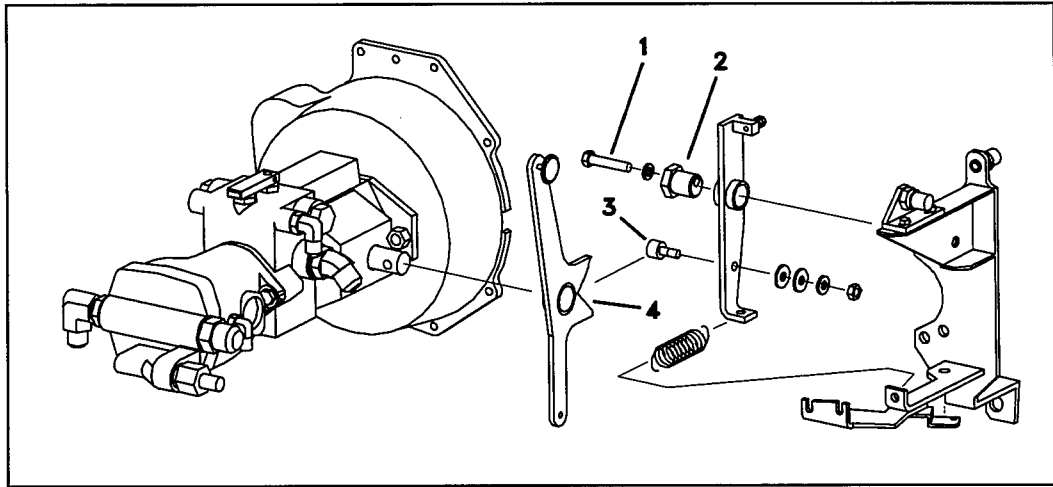
Fig. 48 PEDAL ANGLE ADJUSTMENT

### 5.3.4 BRAKE ADJUSTMENT

A standard automotive type drum brake is used on this machine. Adjust the brake using the regular automotive brake adjustment procedure.

### 5.3.5 NEUTRAL POSITION AND NEUTRAL START ADJUSTMENT

The machine is equipped with a neutral start switch that prevents the engine from starting unless the speed/direction control pedal is in its neutral position. If the machine should start and move without touching the pedal, stop the unit and adjust the linkage.



To adjust the neutral start switch linkage, follow this procedure:

1. Stop the engine, place all controls in the OFF position, set the park brake, remove ignition key and wait for all moving parts to stop.



#### WARNING

Always maintain the neutral start switch such that the hydrostatic drive will not move the machine when starting the engine.

2. Place blocks in front and behind front wheels to prevent vehicle from moving.
3. Lift both rear wheels off the ground by jacking under wheel motors.
4. Place safety stands under frame.



#### DANGER

Engine and exhaust manifold will be hot while adjusting the neutral. These hot components can cause burns.

5. Open engine door and latch it open.



#### DANGER

Ensure all safety precautions are taken while adjusting neutral start switch. The machine may move. Only qualified and experienced mechanics should perform this operation.

6. Loosen the locking bolt (1) on pump control bracket.
7. Start engine and keep clear of all moving parts. Turn the bracket (2) until the hydrostatic pump is in neutral while the cam roller (3) seats in the lowest part of the cam plate (4) and rear wheels stop turning.
8. Stop engine.
9. Tighten bolt on bracket.
10. If necessary loosen and readjust screw that rests on neutral start micro-switch and ensure contact is made when roller rests in the lowest part of the cam plate.
11. Close engine door.
12. Remove safety stands and lower rear wheels to the ground.
13. Start engine. It should now start only when the foot pedal is in its centered position and the unit in neutral.



### 5.3.6 INTAKE TUBE REPLACEMENT

The main wearing part of this machine is the intake tube. Expected life ranges from a few months to a few years depending on the amount of use and how abrasive the trash is. Holes usually appear where the material flow changes directions and affects the performance of the unit by reducing the vacuum.

To change intake tubes, follow this procedure:

1. Stop the engine, place all controls in the OFF position, set the park brake, remove ignition key and wait for all moving parts to stop.
2. Remove the clamps from the top and the bottom ends of the tube.
3. Remove the tube and replace with a new one.
4. Tighten the attaching clamps on the top and bottom ends of the tube.

#### IMPORTANT

Use only genuine MADVAC replacement parts to insure maximum life and performance.



Fig. 49 TUBE REPLACEMENT

### 5.3.7 ENGINE SPEED SETTINGS

Idle	1200 RPM
High speed	2900 RPM

### 5.4 TOWING

Hydrostatically powered vehicles have fluid power to their drive wheels at all times. As a result, they can not be towed unless this fluid power is relieved. The MadVac features a dump valve on the top of the pump that allows the motor drive circuit oil to bypass.

Open the valve by turning it 90° when it is necessary to tow the vehicle. This valve is built into the hydrostatic pump.

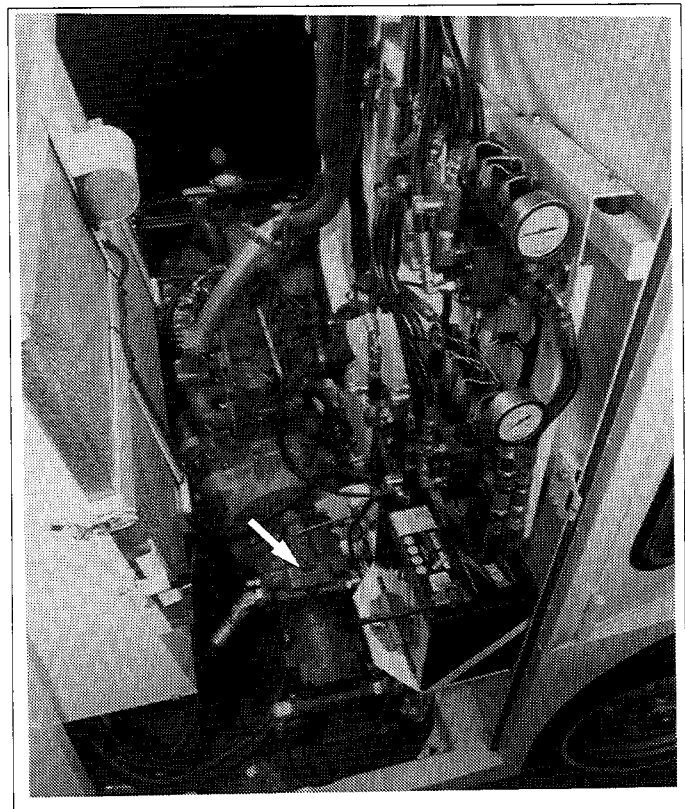


Fig. 50 TOW VALVE

## 6 OPTIONS

Several optional attachments have been developed to enhance the efficiency of the MadVac in special applications.

### 6.1 15 FOOT EXTENSION INLET

This flexible hand held 15 foot extension attaches to the container rear door and allows the operator to pick up litter in hard to reach areas.



Fig. 51 15 FOOT EXTENSION

### 6.2 36 INCH VACUUM HEAD

A 36 inch vacuum nozzle attaches to the inlet tube and allows the operator to pick up litter over a much wider area while vacuuming.



Fig. 52 36 INCH VACUUM HEAD

### 6.3 DIFFERENTIAL LOCK

This precision hydraulic oil flow divider system equally divides the oil to the traction drive motors. Engage when going over rough terrain. Do not use when the terrain is even or when transporting.

## 7 TROUBLESHOOTING

The MADVAC uses a hydraulically powered fan to evacuate the air from a trash container. A fabric bag in the container collects the trash as it is drawn into the intake tube. It is a simple and effective method to gather trash that requires minimum maintenance.

In the following troubleshooting section, we have listed many of the problems, causes and solutions to the problems which you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please contact your authorized dealer or the factory. Before you call, please have this Operator's Manual and the serial number from your machine ready.

PROBLEM	CAUSE	SOLUTION
Engine won't start.	Starter won't engage.	Check neutral start switch. Adjust or replace as required.
		Battery discharged. Charge battery.
		Check battery terminals. Clean as required.
		Check all electrical connections. Clean or replace as required.
		Check starter. Replace as required.
		Check relay beside fuse box. Replace as required.
Machine won't move.	Starter engages.	Check fuel. Add as required.
		Engage glow plug for 20 seconds if engine is cold.
	Low oil.	Check oil level. Add as required.
		Check suction strainer. Clean if plugged.  Close hydrostatic dump valve.
	Linkage disconnected.	Check pedal linkage. Adjust or tighten as required.
	Hydrostatic pump/motor defective.	Check hydrostatic components.
		Check filter.
		Repair or replace as required. See your authorized distributor. Check and release parking brake.

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Hard steering.	Low oil.	Check oil level. Add as required.
	Filter plugged.	Replace return filter.
	System cold.	Allow more time for system to warm up before using.
<hr/>		
Intake arm won't move.	Low oil.	Check oil level. Add as required.
	Filter plugged.	Replace return filter.
	System cold.	Allow more time for system to warm up before using.
	Flow control valve plugged.	See section 5.3.1, open and readjust screw.
	Defective electrical system.	Inspect all electrical connections. Clean, tighten or replace as required.  Joy stick switch defective. Replace.  Wires damaged. Replace.  Defective solenoid valves. Replace.
<hr/>		
Can't pick up trash.	No vacuum	Trash container full. Empty container as required.
		Filter is clogged. Clean and use vibrator more often.
		Low oil level. Add as required.
		Obstruction in fan or suction path. Remove obstruction. Ensure machine is OFF and all moving parts are stopped.
		Fan doesn't turn. Defective motor. Replace. See your distributor.
		Container isn't sealed. Move into fully seated position.
		Hole in intake tube. Replace intake tube.
		Intake tube plugged. Clear obstruction from tube.
		Tube improperly clamped. Tighten clamps.

## 8 SPECIFICATIONS

### 8.1 MECHANICAL

#### DIMENSIONS

Overall Width:	52 in. (1320 mm)
Overall Length:	117 in. (2972 mm)
Overall Height:	85 in. (2160 mm)
Wheel Base:	66 in. (1675 mm)
Ground Clearance:	10 in. (255 mm)
Weight:	3290 lbs. (1495 Kg.) with all fluids

#### VACUUM

System Type:	Straight-through suction
Power:	Fully hydraulic system, directly from main engine
Vacuum Pump:	Cast alloy centrifugal fan, statically & dynamically balanced. Heavy gauge steel casing, aerodynamic design
Impeller Speed:	3000 RPM
Performance:	Static pressure at closed inlet: 32 in. of water gauge pressure Suction pressure at open inlet: 14 in. of water gauge pressure
Inlet Lift Arm:	Fully remote arm control
Main Hose:	8 in. (203 mm) dia., clear PVC with black helix reinforcement, smooth bore
Container:	Heavy gauge galvanized steel, 1.3 cu. yard (1 cu. meter) capacity
Liner:	Woven poly mesh on all surfaces
Filtering System:	Two stage filter system. Quick change polyester panel filter for fine particles. Electric shaker for filter cleaning.
Dumping Mechanism:	Totally controlled from cab. Solenoid control for independent lift, tilt and door mechanism
Dumping Height:	Variable from ground level to 6 ft. (1829 mm) high dump

**SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE**

## **VEHICLE**

Engine:	Kubota liquid cooled, 37.5 HP gross @ 3000 RPM, 4 cylinder 91.44 cu. in. (1498 cc) disp.
Fuel:	Diesel fuel, 16 gallon tank (60 liters)
Air Cleaner:	"Donaldson" high capacity two stage cyclonic with restriction indicator for servicing
Hydrostatic Drive System:	All hydraulic drive; variable displacement piston pump infinitely variable hydrostatic pump directly coupled to main engine
Hydraulic Oil:	Oil cooler standard. Tank capacity 20 gallons (75 liters) with oil filter replacement indicator. Internal baffle in reservoir for improved cooling
Steering:	Automotive type, completely power assisted
Turning Radius:	36 in. (910 mm) to the inside wheel
Suspension:	Hydropneumatic suspension on all four wheels
Brakes:	Foot operated automotive type hydraulic drum brake on front wheels, mechanical parking brake. Dynamic braking on rear wheel hydrostatic drive train
Frame/Body:	Fully welded combination of heavy gauge steel sheet and 1/8" thick structural steel frame
Tires:	(4) 175/80R13, 4 season radials

## **ELECTRICAL**

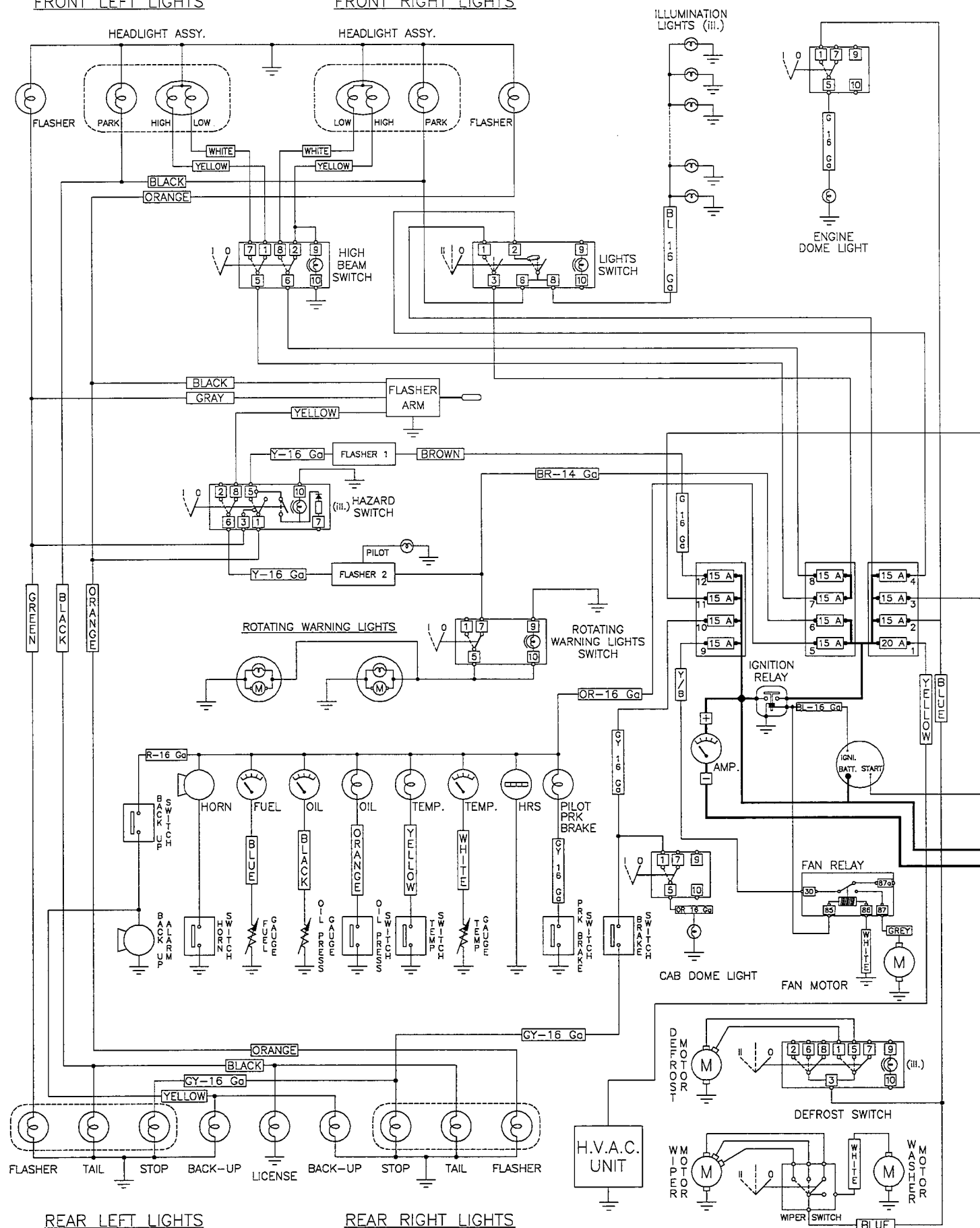
Safety Switches:	Prevent starting engine if traction pedal is depressed. Prevent fan from operating if container is raised
Gauges:	Hour meter, ammeter, oil pressure gauge, electric fuel level gauge, and temperature gauge
Lights:	Rotating halogen beacons, front high/low halogen head lamp, tail lights, brake lights, complete signaling package
Ground Speed:	Infinitely variable speed 0-16 MPH (25 Km/h) forward, and 0-6 MPH (9.6 Km/h) reverse. Single foot pedal controls forward/reverse
Electric System:	40 amp alternator, 12 volts, fused for safety

**SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE**

## 8.2 ELECTRICAL DIAGRAM - 231 DIESEL

FRONT LEFT LIGHTS

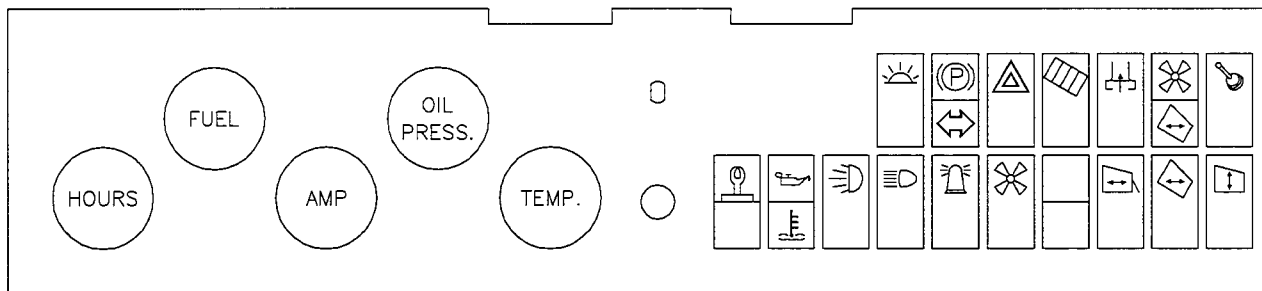
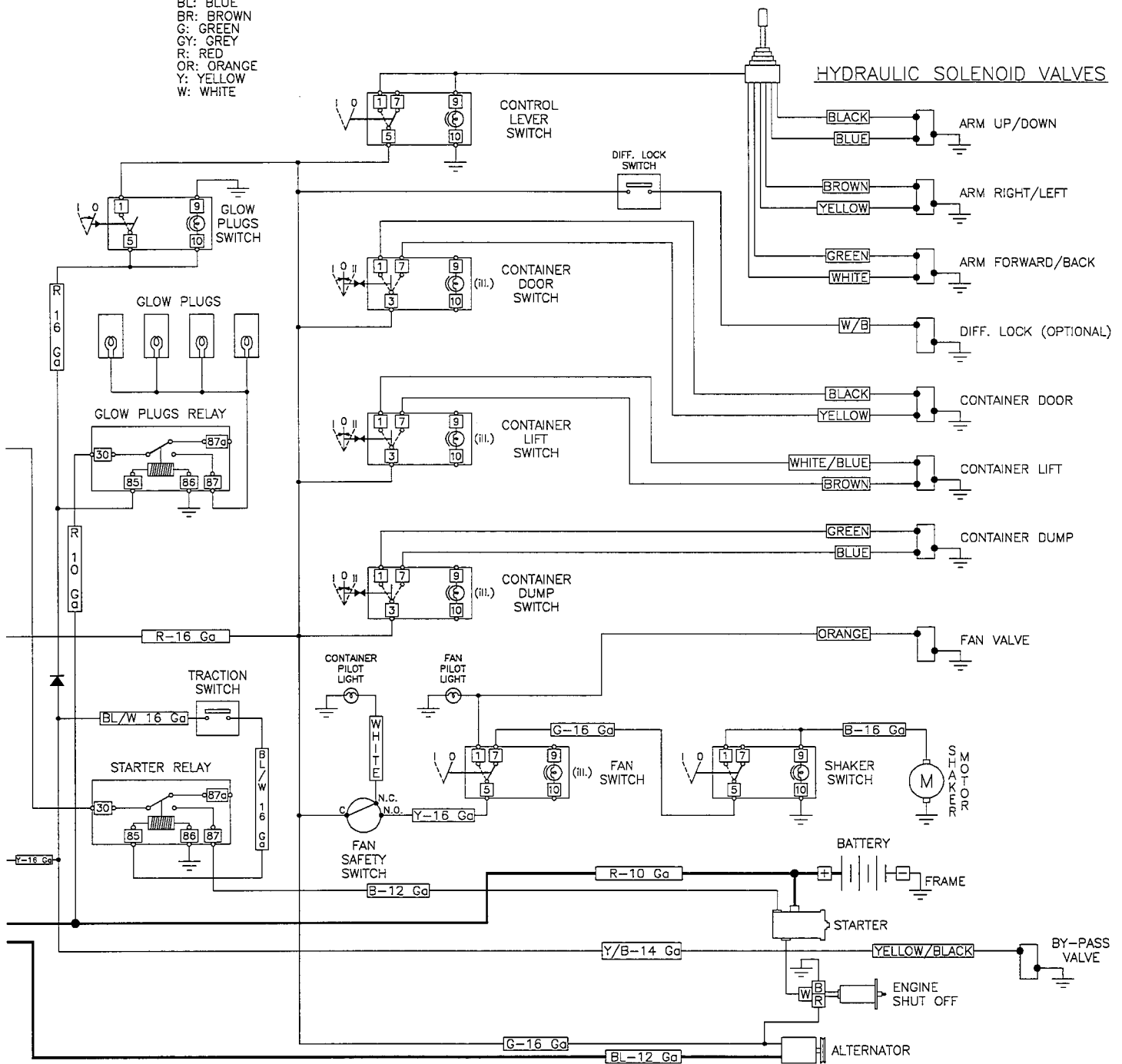
FRONT RIGHT LIGHTS



# COLOUR CODE

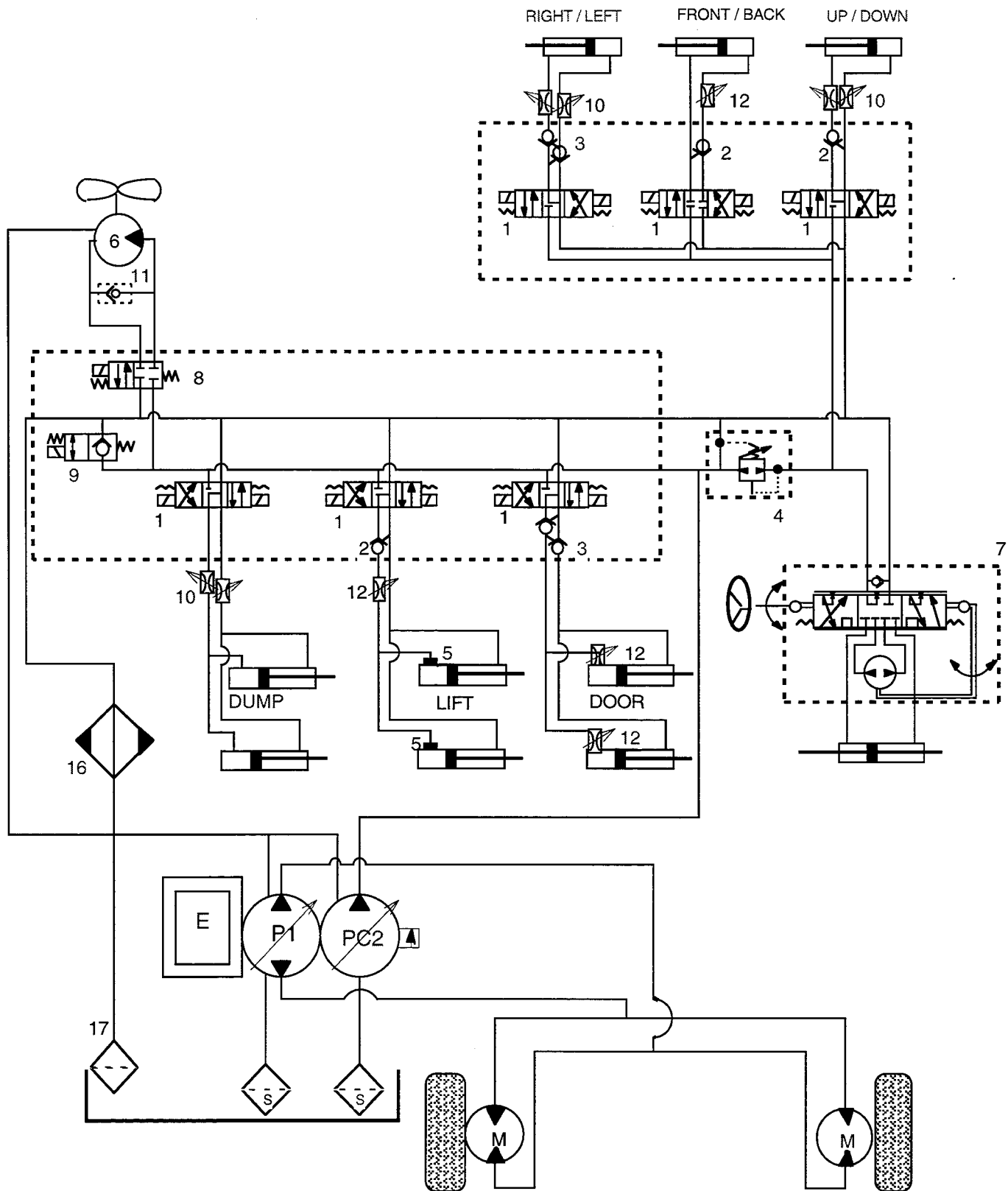
B: BLACK  
BL: BLUE  
BR: BROWN  
G: GREEN  
GY: GREY  
R: RED  
OR: ORANGE  
Y: YELLOW  
W: WHITE

# CONTROL LEVER





### 8.3 HYDRAULIC DIAGRAM



## HYDRAULIC DIAGRAM

ITEM	COMPONENTS	QUANTITY
1	Solenoid valve	6
2	Pilot operated check valve	3
3	Dual pilot operated check valve	2
4	Pressure reducing valve	1
5	Velocity fuse	2
6	Hydraulic fan motor	1
7	Power steering valve	1
8	Solenoid valve	1
9	Unloading valve	1
10	Flow controls	6
11	Check valve	1
12	Needle valve	4
P1	Hydrostatic drive pump	1
PC2	Pressure compensated piston pump	1
M	Hydraulic wheel motor	2
16	Hydraulic oil cooler	1
17	Hydraulic oil filter	1

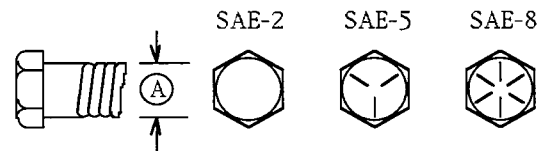
## 8.4 BOLT TORQUE

### CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

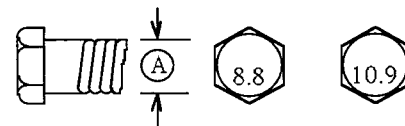
#### ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	SAE 2		Bolt Torque*		SAE 8	
	(N.m.) (lb-ft)		(N.m.) (lb-ft)		(N.m.) (lb-ft)	
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970



#### METRIC TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque			
	8.8		10.9	
	(N.m.)	(lb-ft)	(N.m.)	(lb-ft)
M3	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710



Rear wheel motors should be torqued at 300 to 400 ft. lbs. to hub.

Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

\* Torque value for bolts and capscrews are identified by their head markings.

## 8.4 BOLT TORQUE (continued)

### TIGHTENING O-RING FITTINGS \*

1. Inspect O-ring and seat for dirt or obvious defects.
2. On angle fittings, back the lock nut off until washer bottoms out at top of groove.
3. Hand tighten fitting until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown.
6. Tighten while holding body of fitting with a wrench.

Thread Size (in.)	Size Across Flats (in.)	Torque Value*		Recommended Turn To Tighten (After Finger Tightening)	
		(N.m)	(lb-ft)	(Flats)	(Turn)
3/8	1/2	8	6	2	1/3
7/16	9/16	12	9	2	1/3
1/2	5/8	16	12	2	1/3
9/16	11/16	24	18	2	1/3
3/4	7/8	46	34	2	1/3
7/8	1	62	46	1-1/2	1/4
1-1/6	1-1/4	102	75	1	1/6
1-3/16	1-3/8	122	90	1	1/6
1-5/16	1-1/2	142	105	3/4	1/8
1-5/8	1-7/8	190	140	3/4	1/8
1-7/8	2-1/8	217	160	1/2	1/12

\* The torque values shown are based on lubricated connections as in reassembly.

### TIGHTENING FLARE TYPE TUBE FITTINGS \*

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.

Tube Size OD (in.)	Nut Size Across Flats (in.)	Torque Value*		Recommended Turns To Tighten (After Finger Tightening)	
		(N.m)	(lb-ft)	(Flats)	(Turn)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

\* The torque values shown are based on lubricated connections as in reassembly.

## 9 PARTS LIST

This manual contains a parts list for your machine. It is divided into major sections which correspond to the groups shown in the Table of Contents and the accompanying illustration.

The first page of each major section lists the contents of that section, each of which consists of exploded views and related tabular listings.

### WHEN ORDERING PARTS

Always give your dealer the Model and Serial Number of your machine to assist him in ordering and obtaining the correct parts. Use the exploded view and tabular listing of the area of interest to exactly identify the required part.

### USING THE MANUAL

Parts data consists of exploded view illustrations and associated parts list tables which are read as follows:

#### ITEM

The item number is the identifier number from the illustration. For example, number 3 on an illustration points to a component which is item 3 on the accompanying table.

#### PART NUMBER

The part number is the four or five digit number by which the component may be identified and ordered from C.B.C. Municipal Equipment Inc. and its network of dealers.

#### DESCRIPTION

This column contains the name and description of the part.

#### QUANTITY

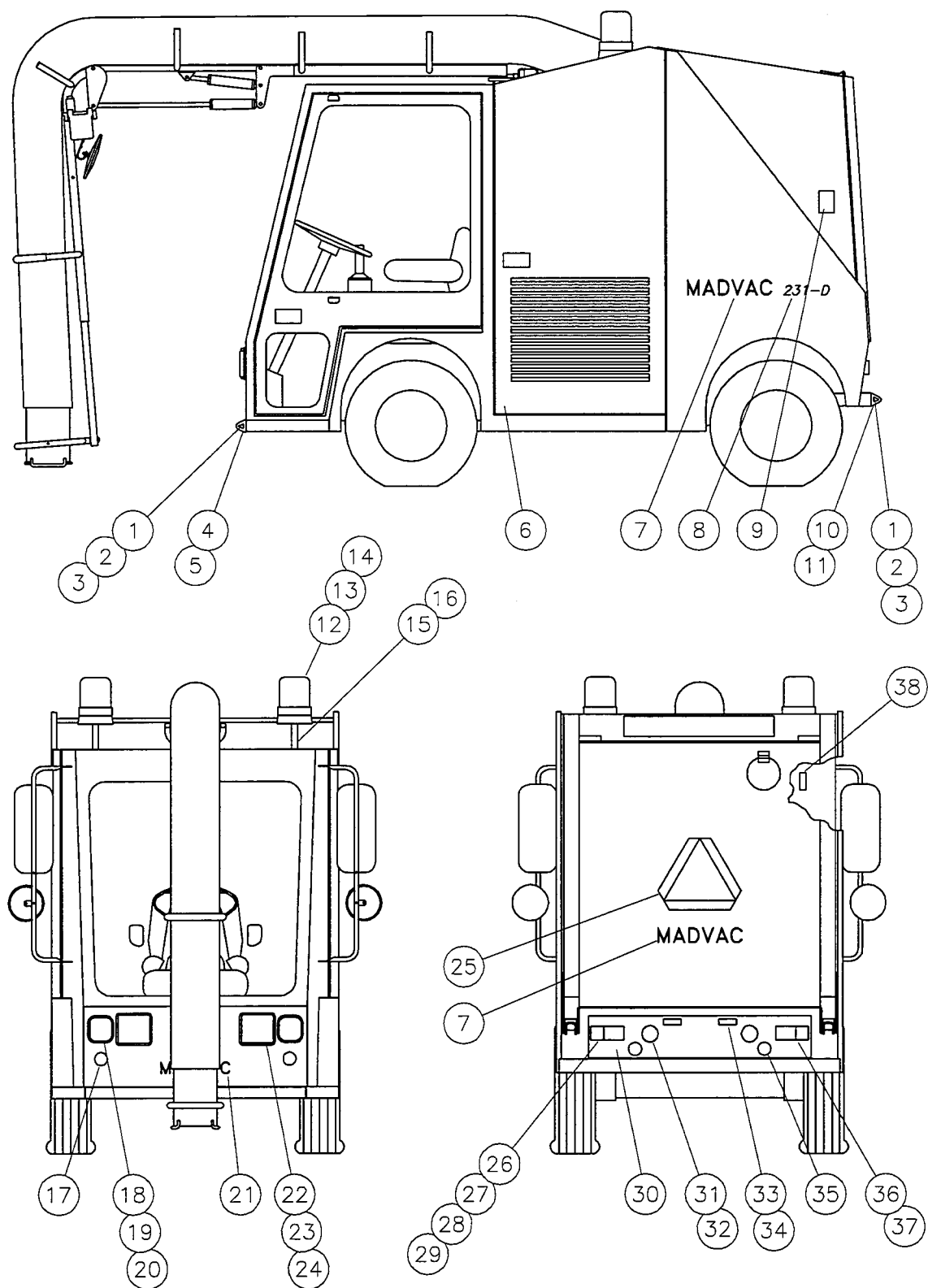
This column shows the quantity of each part used on the component for the model listed on the top. The abbreviation AR means the quantity is As Required.

**Note:** In the illustration and the description, the mention (serial 0000 to 0000) refers to different versions of certain parts in relation to the vehicle serial number.

## 9.1 PARTS LIST INDEX

Description	Page
Lights and stickers -----	62
Cab doors -----	64
Cab -----	66
Windshield wiper -----	68
Joystick support -----	70
Steering column -----	72
Heater air conditionning system -----	74
Engine doors -----	76
Engine -----	78
Hydraulic manifold -----	82
Hydraulic manifold support -----	84
Pump control -----	86
Braking system -----	88
Rear doors -----	90
Vacuum arm -----	92
Container -----	94
Container lift arm -----	96
Fan casing -----	98
Vacuum filter -----	100
Front suspension -----	102
Rear suspension -----	104
Hydraulic oil tank -----	106
Fuel tank -----	108
Hydraulic hoses (traction, steering, arm) -----	110
Hydraulic hoses (vacuum, container) -----	112
Suspension leveling hoses -----	114
Electrical components -----	116
5" extension -----	118
8" extension -----	120
36" vacuum head -----	122

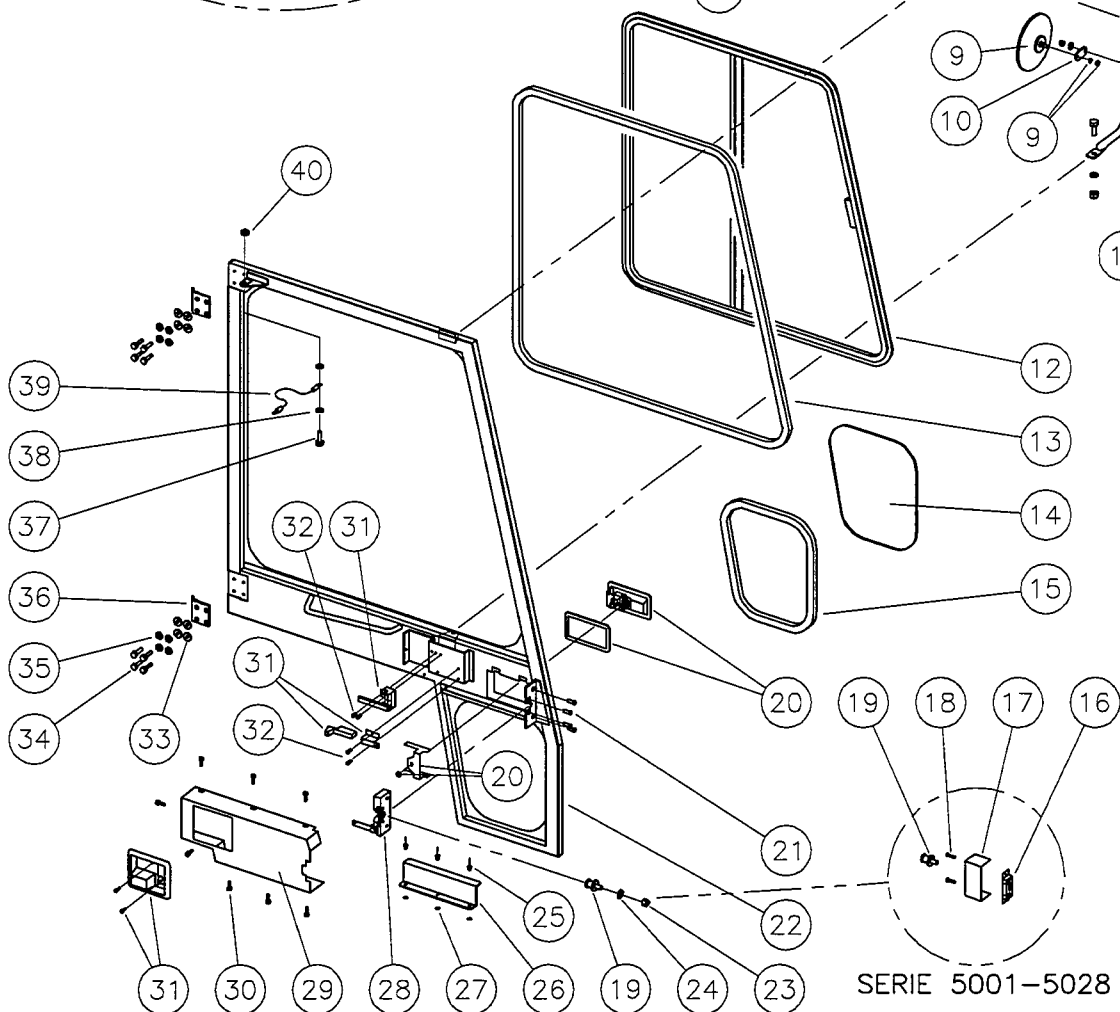
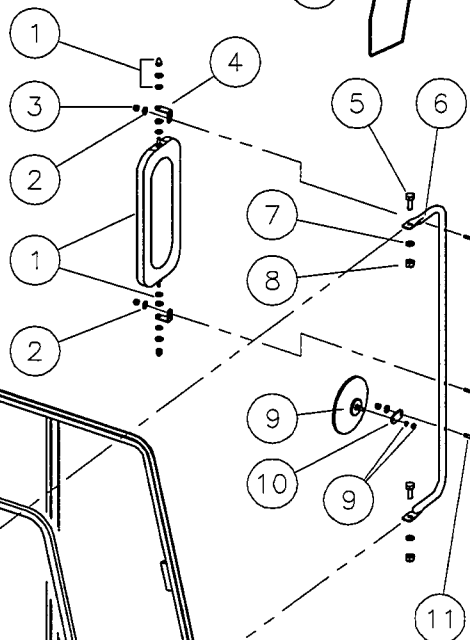
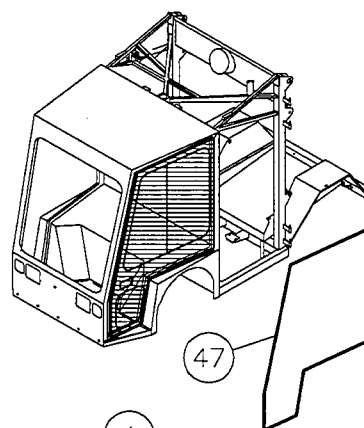
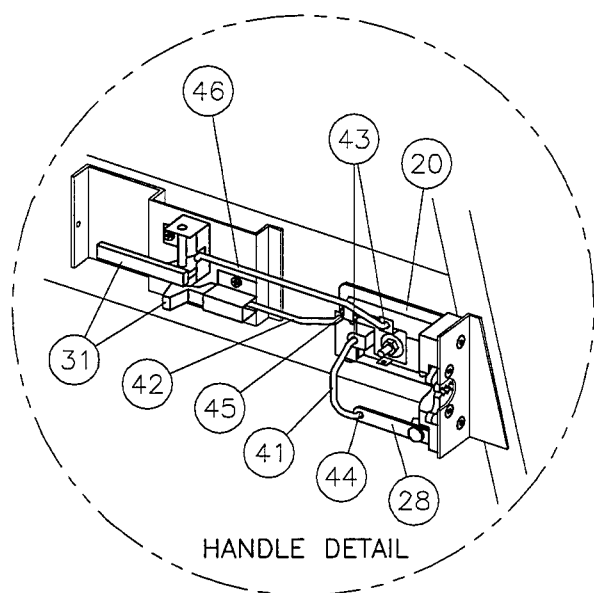
# LIGHTS AND STICKERS



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1		Screw hex. head 5/16"-18 UNC X 3 1/2" Lg	11
2		Lock washer Dia. 5/16"	11
3		Washer Dia. 5/16"	11
4	21386	Bumper front	1
5	21327	Bumper fixture front	1
6	26084	Horn 12V , 400HZ	1
7	7802	Decal - MADVAC (big)	3
8	9248	Decal 231-D	2
9	27295	Decal - Pinching hazard	2
10	21394	Bumper rear	1
11	21335	Bumper fixture rear	1
12	26076	Rotating warning light ass'y	2
13	26319	Rotating light lens replacement	2
14	26291	Bulb replacement for rotating light	2
15	26238	Rotating light support	2
16	29172	U-bolt	2
17	26351	Reflector yellow	2
18	26300	Front flasher ass'y	2
19	26321	Front flasher lens replacement	2
20	26256	Bulb replacement for front flasher	2
21	7810	Decal - MADVAC (small)	1
22	26019	Head light ass'y	2
23	26240	Head light housing	2
24	26254	Bulb replacement for head light	2
25	8205	SMV Emblem	1
26	26086	Left tail stop and flasher light ass'y	1
27	26327	Left tail stop and flasher lens replacement	1
28	26262	Bulb replacement for stop and flasher light	4
29	26264	Bulb replacement for tail light	2
30	21774	Rear light panel	1
31	26070	Back-up light ass'y	2
32	26270	Bulb replacement for back-up light	2
33	26078	Licence plate light ass'y	2
34	26289	Bulb replacement for licence plate light	2
35	26246	Reflector red	2
36	26092	Right tail stop flasher light	1
37	26329	Right tail stop flasher lens	1
38	7934	Serial number plate	1
	7856	Decal - Ignition key (control panel)	1
	7950	Decal - Operating safety (control panel)	1
	7888	Decal - Traction pedal (front light cover)	1
	8450	Decal - Throttle (joystick support)	1
	8485	Decal - Warning hydraulic pressure (filter duct)	1
	8493	Decal - Refueling safety (filter duct)	1
	9228	Decal - Diesel fuel (filter duct)	1

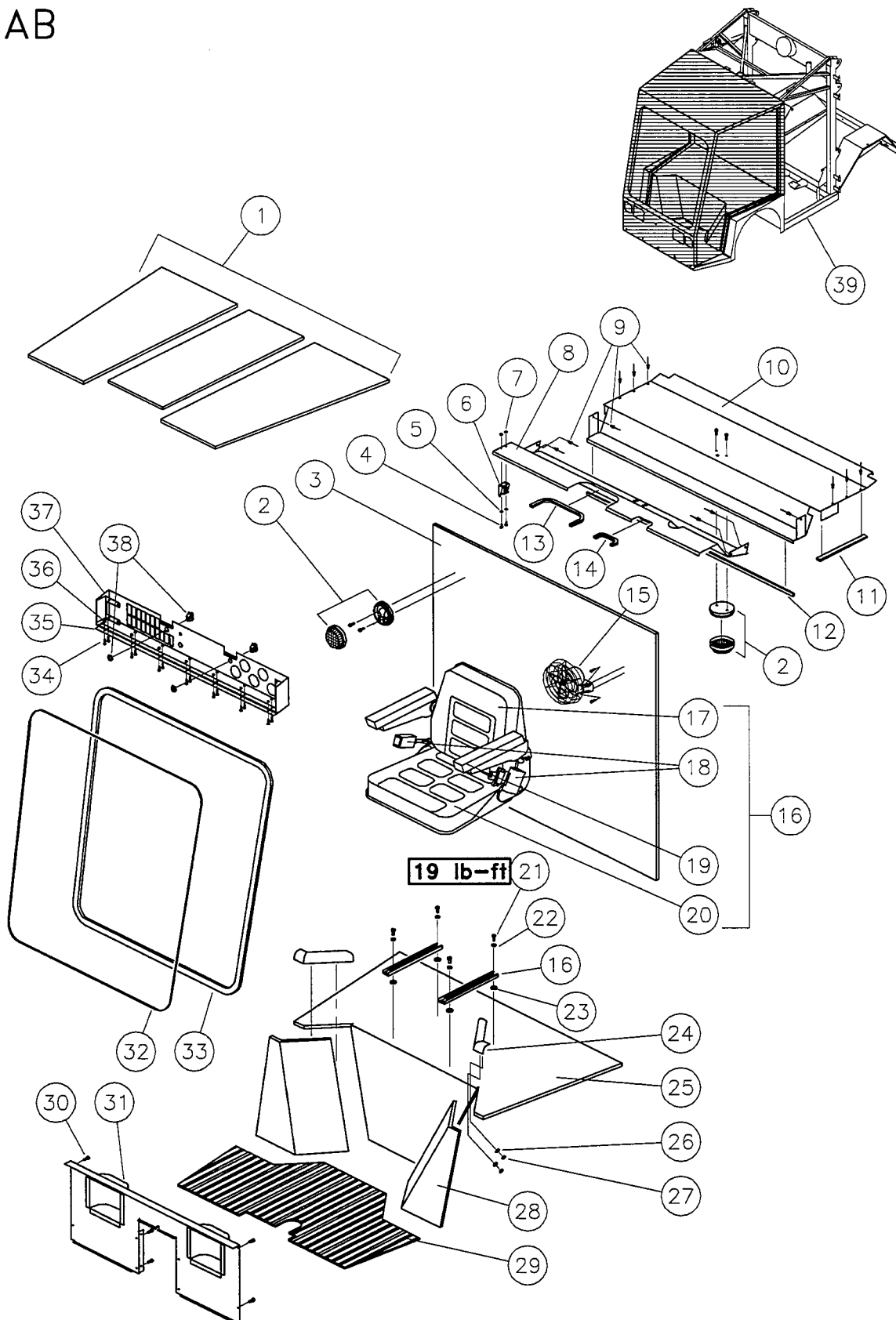


# CAB DOORS



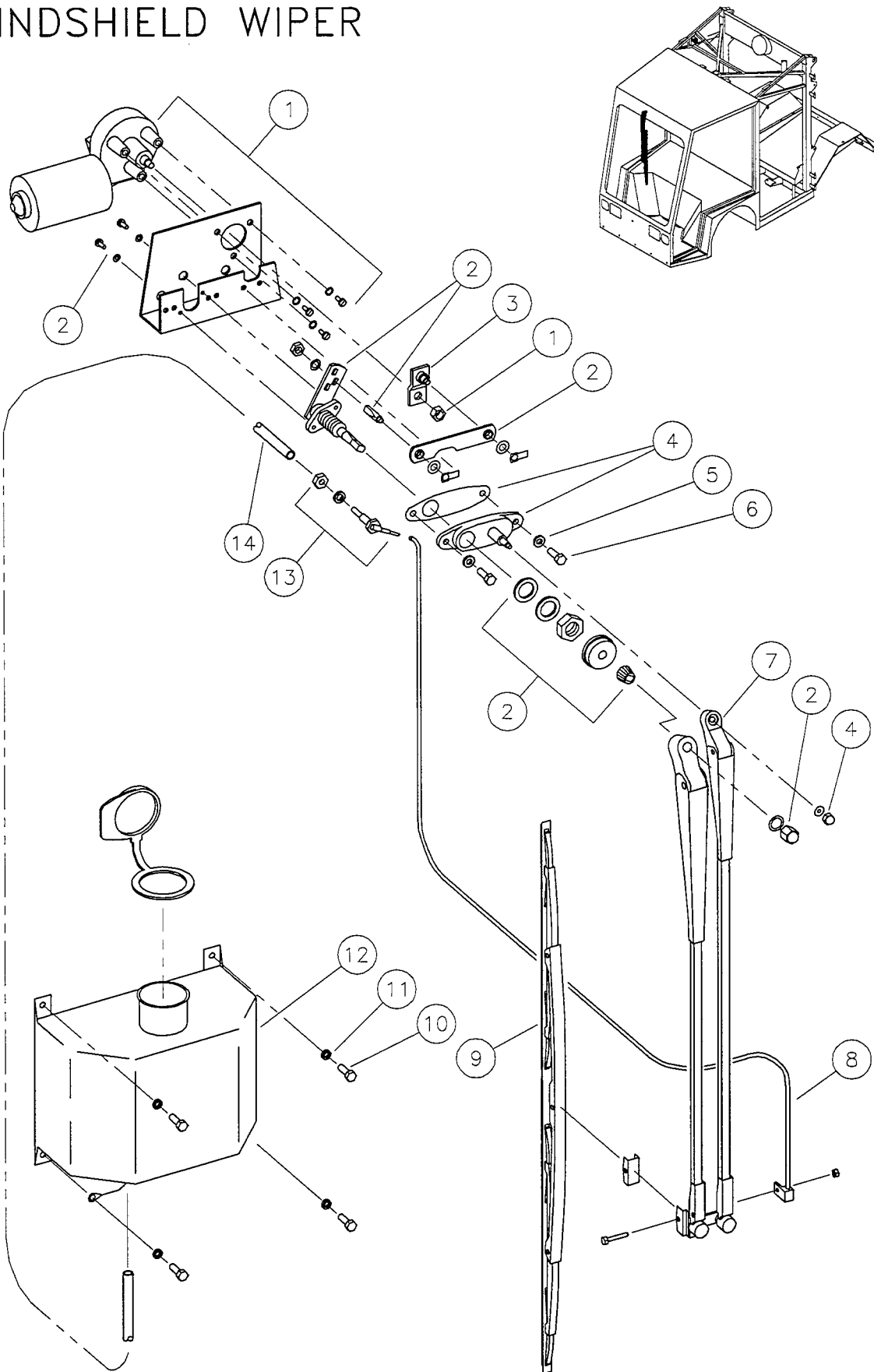
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	27182	Mirror	2
2		Washer Dia. 1/4"	10
3		Lock nut 1/4"-20 UNC	6
4	21807	Mirror bracket	4
5		Screw hex. head 3/8"-16 UNC X 1" Lg	4
6	21672	Mirror holder	2
7		Washer Dia. 3/8"	4
8		Lock nut 3/8"-16 UNC	4
9	9333	Convex Mirror	2
10	21688	Convex mirror support	2
11		Screw hex. head 1/4"-20 UNC X 1 1/4" Lg	6
12	21816	Cab sliding windows left	1
	21815	Cab sliding windows right	1
13	27374	Trim upper glass	2
14	21823	Door bottom window	2
15	27625	Trim lower glass	2
16	27269	Cage nut (serie 5001-5028)	2
17	21637	Cage nut cover (serie 5001-5028)	2
18		Screw flat head square drive 1/4"-20 UNC X 3/4" Lg	4
19	27250	Striker bolt	2
20	27226	Outside RH handle	1
	27228	Outside LH handle	1
21		Screw flat head square drive 1/4"-20 UNC X 3/4" Lg	8
22	21083	Cab door left	1
	21082	Cab door right	1
23		Lock nut 7/16"-14 UNC	2
24		Washer Dia. 7/16"	2
25		Pop rivet	6
26	21106	Cab door step	2
27		Pop rivet washer	6
28	27234	Rotary RH latch	1
	27236	Rotary LH latch	1
29	21761	Cab door cover R	1
	21762	Cab door cover L	1
30		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	16
31	27242	Inside RH handle	1
	27244	Inside LH handle	1
32		Screw hex. head 8-32 UNC X 5/8" Lg	8
33		Washer Dia. 1/4"	16
34		Screw hex. head 1/4"-20 UNC X 3/4" Lg	16
35		Lock washer Dia. 1/4"	16
36	21850	Cab door hinge R	2
	21851	Cab door hinge L	2
37		Screw hex. head 5/16"-18 UNC X 1" Lg	4
38		Washer Dia. 5/16"	12
39	21548	Cab door retaining cable	2
40		Lock nut 5/16"- 18 UNC	4
41	28303	Cab & engine door connecting rod	2
42	21279	Cab door handle lock connecting rod	2
43	27285	Rod clip 7 LH	3
44	27279	Rod clip 7 RH	3
45	27331	Rod clip 4 LH	1
	27376	Rod clip 4 RH	1
46	21074	Cab door handle connecting RH rod	1
	21252	Cab door handle connecting LH rod	1
47	27382	Rubber door trim	2

# CAB



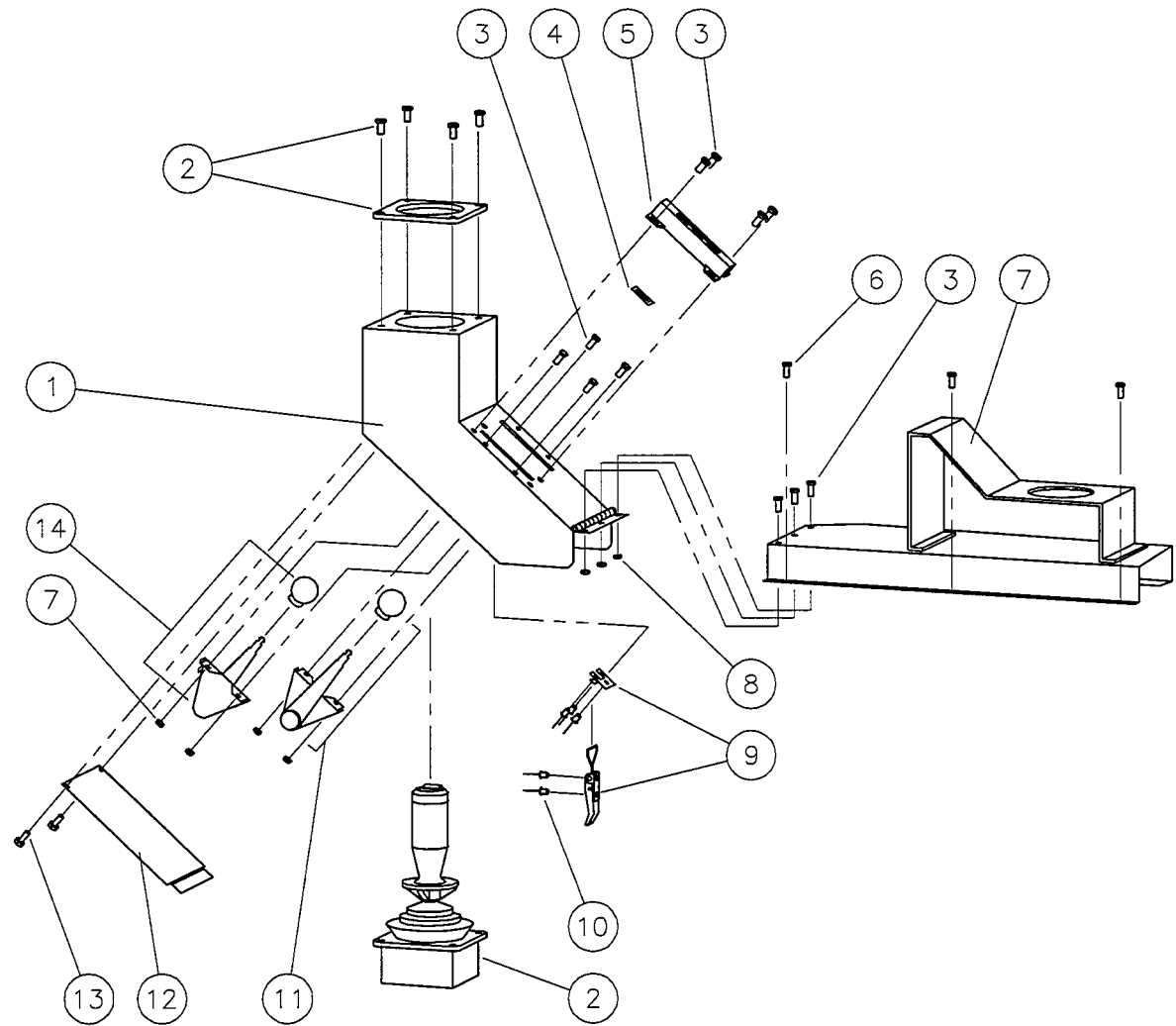
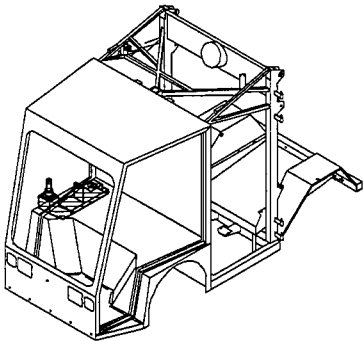
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	27307	Insulating material CAB (top)	1
2	6563	Dome light	2
3	27309	Insulating material CAB	1
4		Screw round head square drive 6-32 UNC	2
5		Washer #6	2
6	26345	Switch (engine compartment light)	1
7		Lock nut 6-32 UNC	2
8	21467	Front rain shield	1
9		Pop rivet	12
10	21459	Rear rain shield	1
11		Rubber band	2
12	27627	Trim rain shield	1
13	27676	Trim large U, rain shield	1
14	27677	Trim small U, rain shield	1
15	26232	Defrost Fan	1
16	27147	Seat ass'y	1
17	27163	Back cushion	1
18	27155	Retractable seat belt	1
19	27153	Arm rest kit	1
20	27161	Seat cushion	1
21		Screw hex. head 5/16"-18 UNC X 3/4" Lg, TORQUE: 19 lb-ft	4
22		Lock washer Dia. 5/16"	4
23		Washer Dia. 5/16"	4
24	21599	Carpet mold right	1
	21600	Carpet mold left	1
25	27315	Insulating mat	1
26		Washer Dia. 1/4"	4
27		Lock nut 1/4"-20 UNC	4
28	27317	Insulating mat (right)	1
	27318	Insulating mat (left)	1
29	27323	Floor mat	1
30		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	8
31	21165	Front light cover	1
32	21203	Glass Winshield	1
33	27325	Rubber glass trim	1
34		Screw hex. head 10-32 UNF X 3/4" Lg	14
35	21295	Hinge control panel (serie 5075+)	1
36		Lock nut 10-32 UNF	14
37	21149	Control Panel	1
38	8264	Control pannel latch	2
39	21009	Chassis	1

# WINDSHIELD WIPER



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	27074	Wiper motor kit	1
2	27099	Wiper pivot shaft	1
3	27080	Wiper crank arm	1
4	27101	Pantograph adapter kit	1
5		Lock washer Dia. 6mm	2
6		Screw hex. head M6-20mm	2
7	27110	Wiper arm	1
8	27104	Wiper wet arm kit	1
9	27129	Wiper blade	1
10		Screw hex. head 1/4"-20 UNC X 3/4" Lg	4
11		Lock washer Dia. 1/4"	4
12	27131	Reservoir ass'y (windshield washer)	1
13	27102	Wiper adaptor	1
14	25258	Hose washer fluid	1

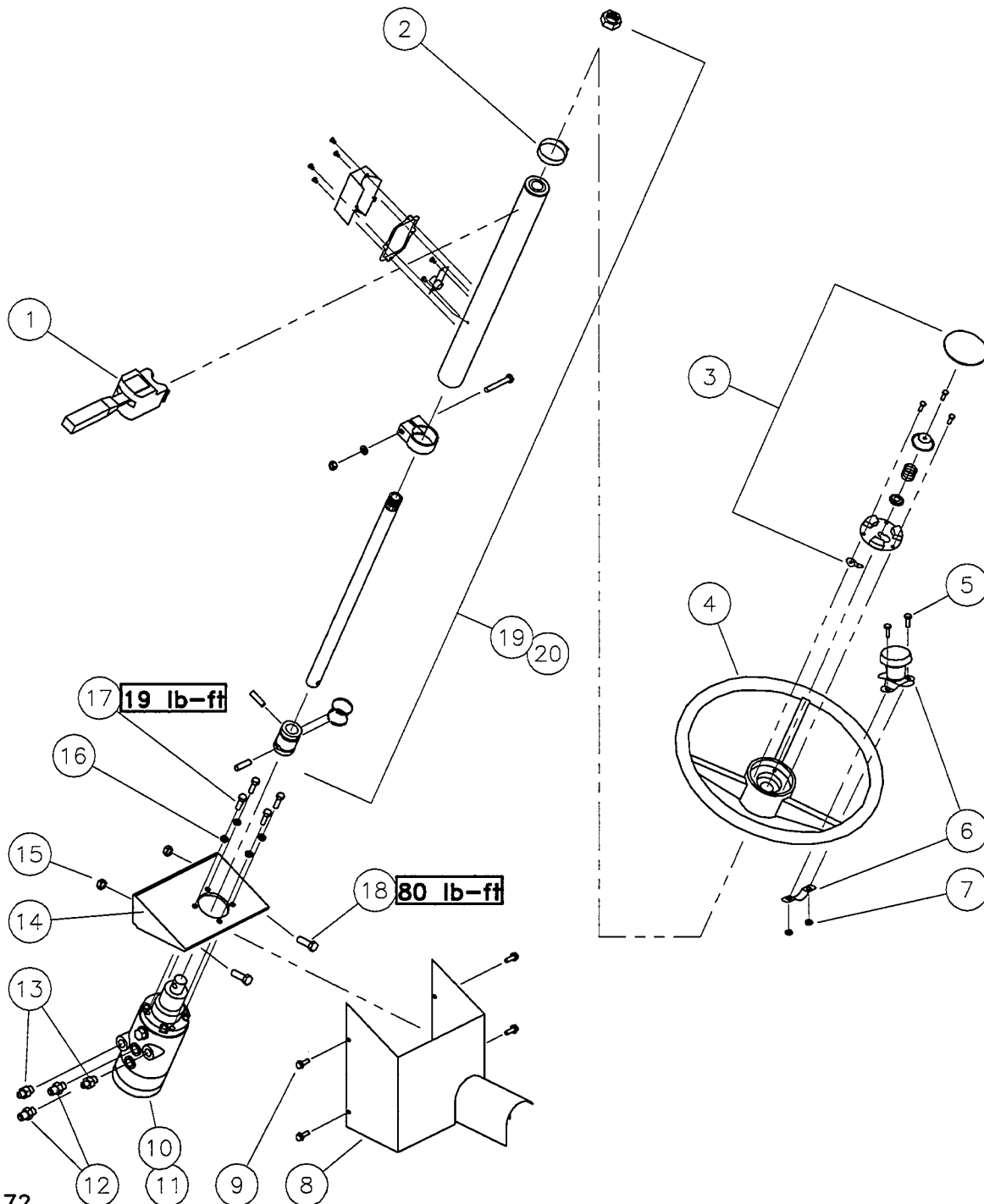
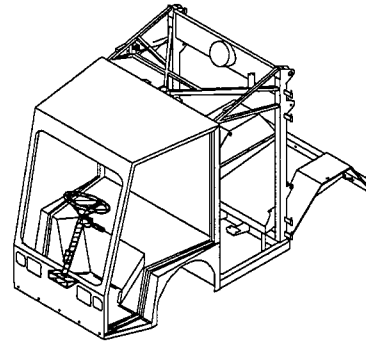
# JOYSTICK SUPPORT



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	21901	Joy stick support	1
2	26337	Joy stick	1
	26211	Micro-switch handle	2
	26379	Micro-switch lower	4
3		Screw hex. head 10-32 UNF X 1/2" Lg	11
4	8450	Decal - Throttle	1
5	21990	Transmission shifter selector (option)	1
6		Screw hex. head 1/4"-20 UNC X 3/4" Lg	3
7	21904	Hand brake support	1
8		Lock nut 10-32 UNC	7
9	27368	Latch	1
10		Pop rivet	5
11	28046	Throttle lever and cable	1
12	21343	Joy stick Cover	1
13		Screw self tap hex. head 10-32 UNF X 1/2" Lg	2
14	28561	Transmission lever and cable (option)	1

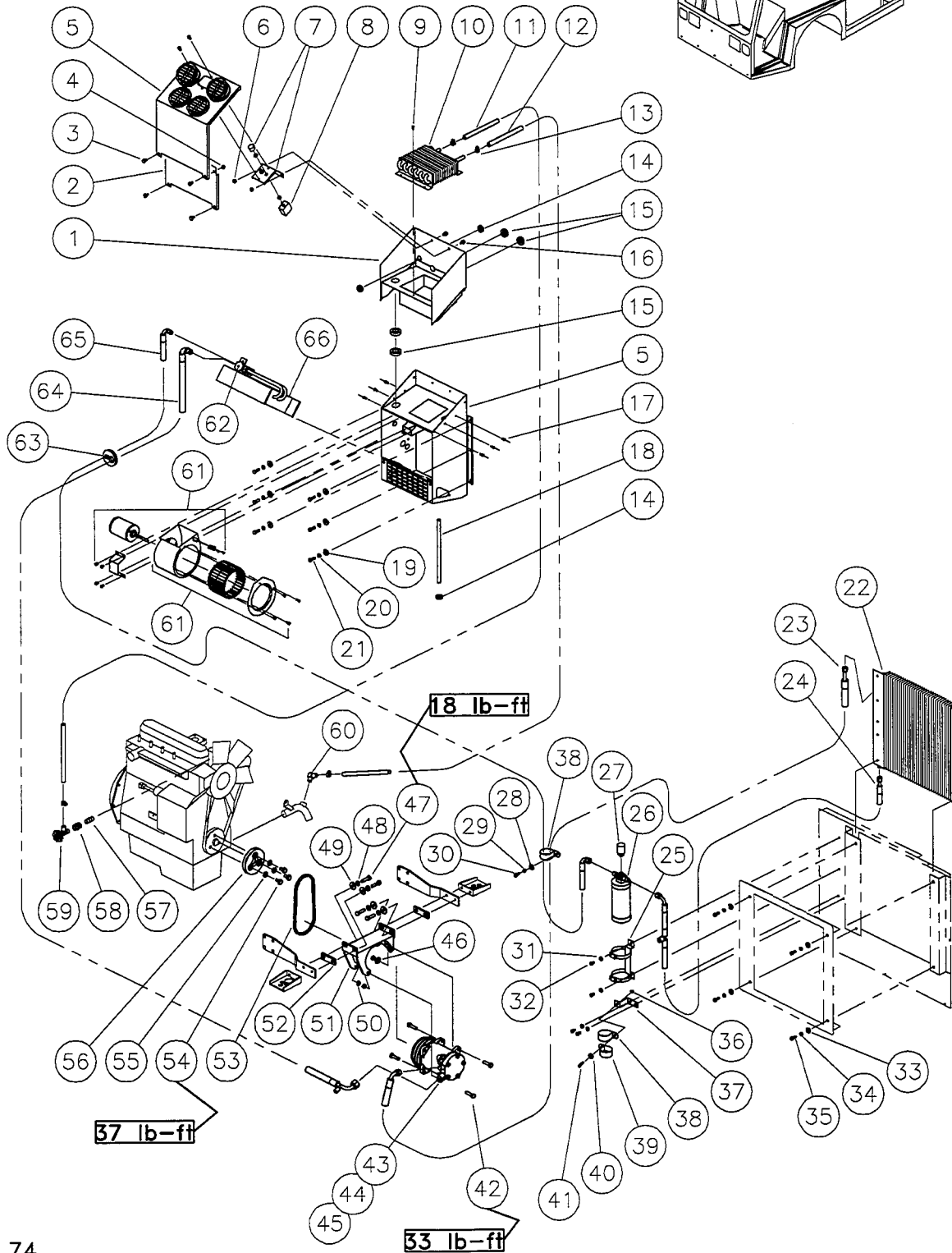
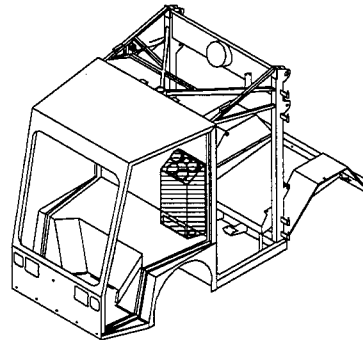


# STEERING COLUMN



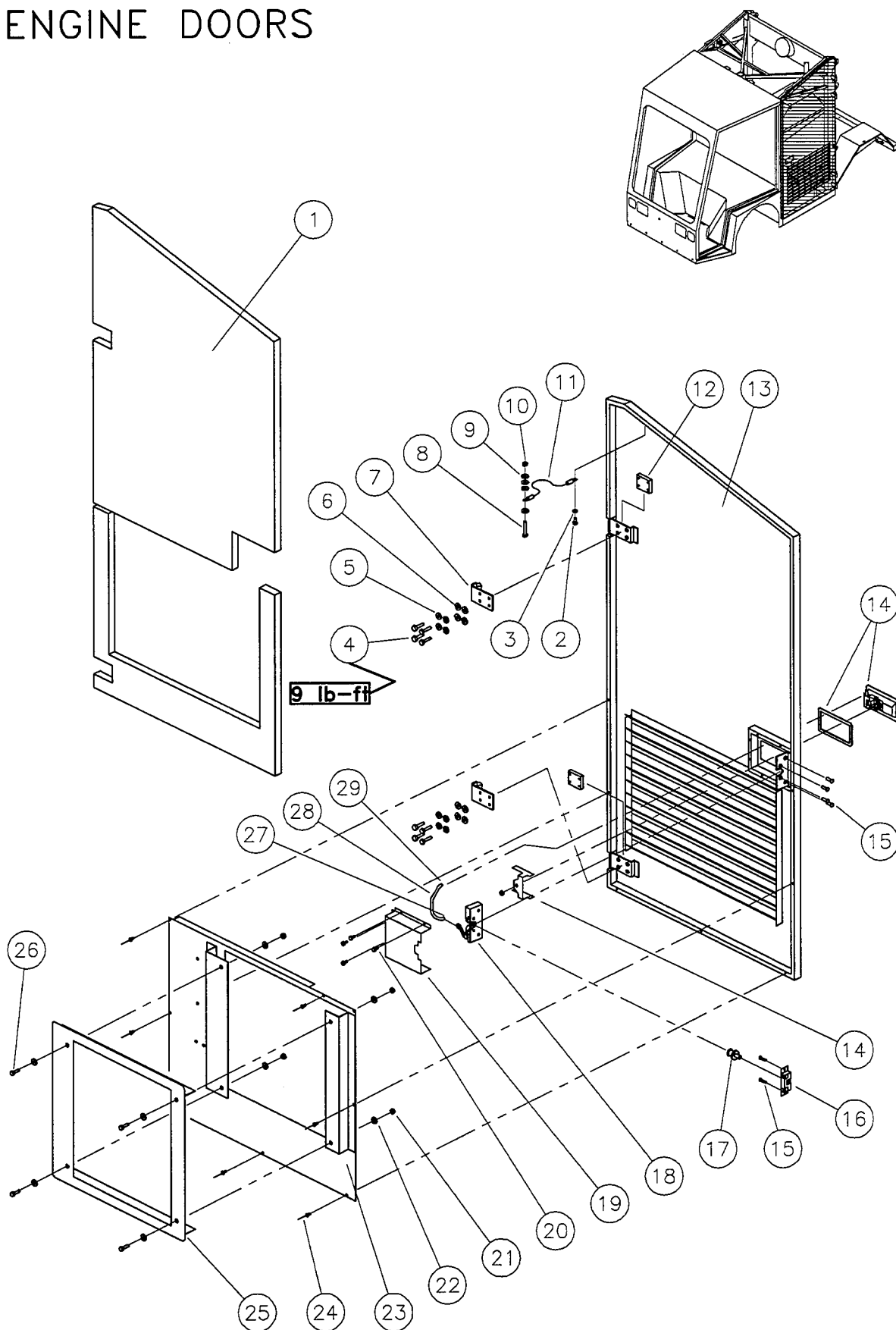
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	6210	Flasher arm	1
2	9546	Clamp	1
3	25136	Horn button kit	1
4	25144	Steering wheel	1
5		Screw hex. head 1/4"-20 UNC X 1" Lg	2
6	7489	Steering handle	1
7		Lock nut 1/4"-20 UNC	2
8	21192	Steering valve cover	1
9		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	4
10	25177	Power steering valve	1
11	25090	Steering valve seal kit	
12	4285	Fitting (serie 5001-5027)	2
	4420	Fitting (serie 5027-5042)	1
	4285	Fitting (serie 5027-5042)	1
	4420	Fitting (serie 5043 +)	2
13	25452	Fitting (serie 5001-5042)	2
	25454	Fitting (serie 5043 +)	2
14	21874	Steering support	1
15		Lock nuts 1/2"-13 UNC	2
16		Lock washer Dia. 5/16"	4
17		Screw hex. head 5/16"-18 UNC X 3/4" Lg, TORQUE: 19 lb-ft	4
18		Screw hex. head 1/2"-13 UNC X 1 1/4" Lg, TORQUE: 80 lb-ft	2
19	25171	Power steering Column	1
20	24308	Seal kit (column)	

# HEATER, A/C SYSTEM



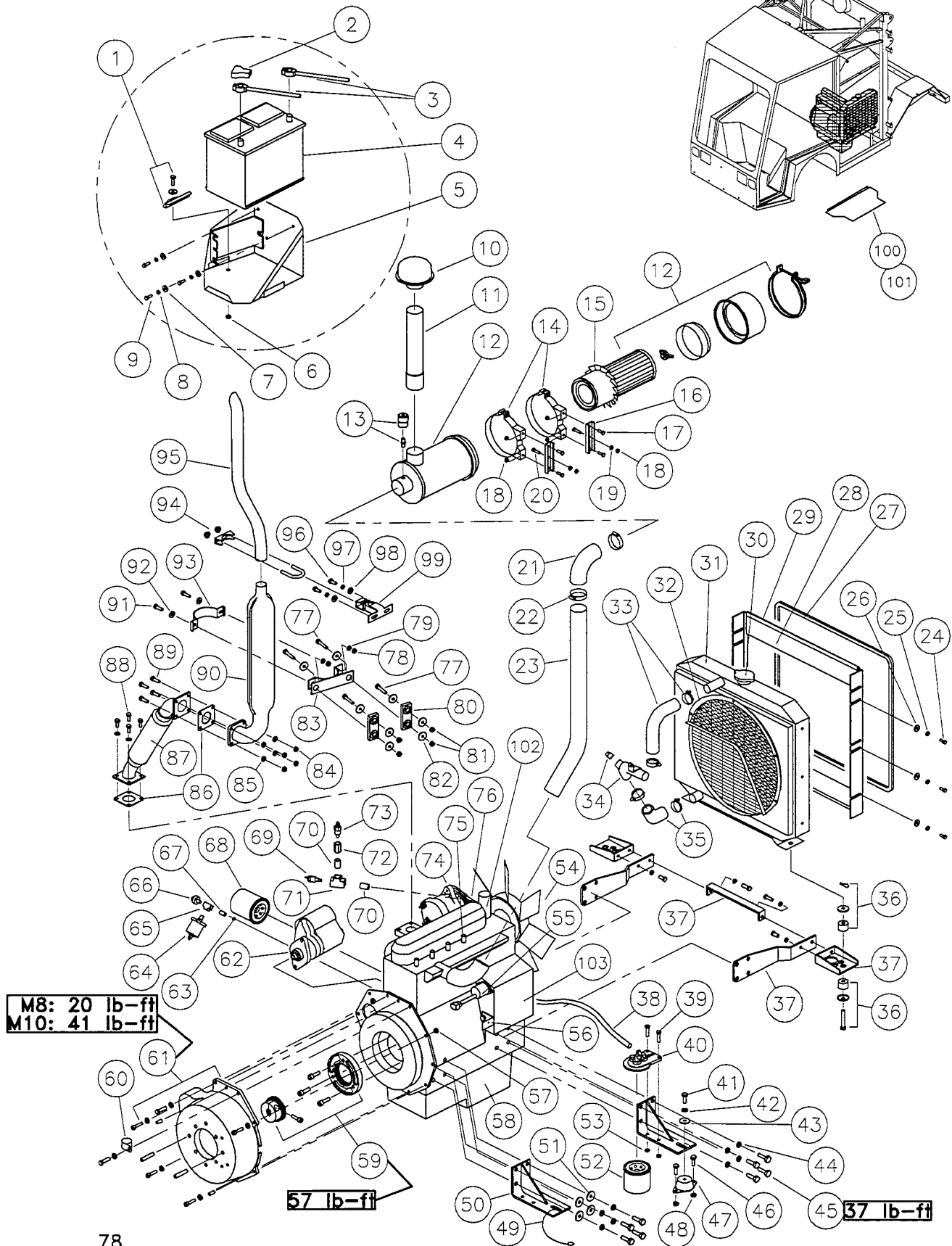
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	28370	Heater core support III (Heater option)	1
2	28003	A/C front panel (Heater option)	1
3		Screw hex. head 1/4"-20 UNC X 1/2" Lg	2
4		Lock nut 1/4"-20 UNC	2
5	27333	Housing and cover assy.	1
6		Lock nut 1/4"-20 UNC	2
7	26353	Thermostat and knob	1
8	26372	Switch	1
9		Screw self tap hex. head 10-32 UNF X 1/2" Lg	1
10	28060	Heater radiator	1
11	25207	Hose heater	1
12	25209	Hose heater	1
13	9538	Hose clamp 1"	4
14	27358	Grommet	3
15	27597	Grommet	4
16		Screw hex. head 1/4"-20 UNC X 1/2" Lg	2
17		Pop rivet	6
18	25223	Hose (drain)	1
19		Washer Dia. 5/16"	6
20		Lock washer Dia 5/16"	6
21		Screw hex. head 5/16"-18 UNC X 1 1/4" Lg	6
22	25187	A/C condenser	1
23	25215	Hose (compressor-condenser)	1
24	25217	Hose (condenser-drier)	1
25	27212	A/C dryer bracket	1
26	25195	A/C dryer	1
27	26343	A/C binary pressure switch	1
28		Washer Dia. 1/4"	1
29		Lock washer Dia. 1/4"	1
30		Screw hex. head 1/4"-20 UNC X 3/4" Lg	1
31		Lock washer Dia. 1/4"	4
32		Screw hex. head 1/4"-20 UNC X 1/2" Lg	4
33		Washer Dia. 1/4"	4
34		Lock washer Dia. 1/4"	4
35		Screw round head square drive 1/4"-20 UNC X 3/4" Lg	4
36		Lock nut 1/4"-20 UNC	1
37	29093	A/C hose support	1
38	25233	Clamp 29	2
39	25252	Clamp 19	1
40		Washer Dia. 1/4"	1
41		Screw hex. head 1/4"-20 UNC X 1" Lg	1
42		Screw hex. head 3/8"-16 UNC X 1 1/2" Lg, TORQUE: 33 lb-ft	4
43	28419	A/C compressor	1
44	28400	A/C compressor clutch	1
45	28494	A/C compressor coil	1
46		Washer dia. 3/8"	2
47		Screw hex. head M8-40mm Lg, TORQUE: 18 lb-ft	4
48		Lock washer Dia. 8mm	4
49		Washer Dia. 8mm	4
50		Lock nut 3/8"-16 UNC	4
51	28340	A/C compressor support	1
52	28607	Radiator support spacer	2
53	28206	A/C V belt	1
54		Screw hex.head M10-20mm Lg, TORQUE: 37 lb-ft	3
55		Lock washer Dia. 10mm	3
56	28022	A/C pulley	1
57	25061	Heater fitting	1
58	25053	Heater fitting	1
59	25045	Heater fitting	1
60	25088	Heater fitting	1
61	27595	Motor and blower scroll ass'y	1
62	26213	Expansion valve	1
63	28486	A/C grommet	1
64	25225	Hose (evaporator-compressor)	1
65	25231	Hose (drier-evaporator)	1
66	25185	A/C Evaporator (R134-A)	1

# ENGINE DOORS



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	29016	Engine door foam L	1
	29008	Engine door foam R	1
2		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	2
3		Washer Dia. 1/4"	2
4		Screw hex. head 1/4"-20 UNC X 3/4" Lg, TORQUE: 9 lb-ft	16
5		Lock washer Dia. 1/4"	16
6		Washer Dia. 1/4"	16
7	21728	Engine door hinge L	2
	21726	Engine door hinge R	2
8		Screw hex. head 5/16"-18 UNC X 1 3/4" Lg	2
9		Washer Dia. 5/16"	8
10		Lock nut 5/16"-18 UNC	2
11	21548	Engine door retaining cable	2
12	21734	Hinge back plate	4
13	21283	Engine Door Left	1
	21282	Engine Door Right	1
14	27293	Engine handle left	1
	27287	Engine handle right	1
15		Screw flat head 1/4"-20 UNC X 3/4" Lg	12
16	27269	Cage nut	2
17	27250	Striker bolt	2
18	27234	Rotary RH latch	1
	27236	Rotary LH latch	1
19	21931	Engine door handle cover L	1
	21963	Engine door handle cover R	1
20		Screw self tap hex. head 10-32 UNF X 1/2" Lg	8
21		Lock nut 1/4"-20 UNC	4
22		Washer Dia. 1/4"	8
23	21955	Air flow driving plate	1
24		Pop rivet	8
25	21947	Condenser plate	1
26		Screw round head square drive 1/4"-20 UNC X 3/4" Lg	4
27	27279	Rod clip 7 RH	2
28	28303	Cab & engine door connecting rod	2
29	27285	Rod clip 7 LH	2

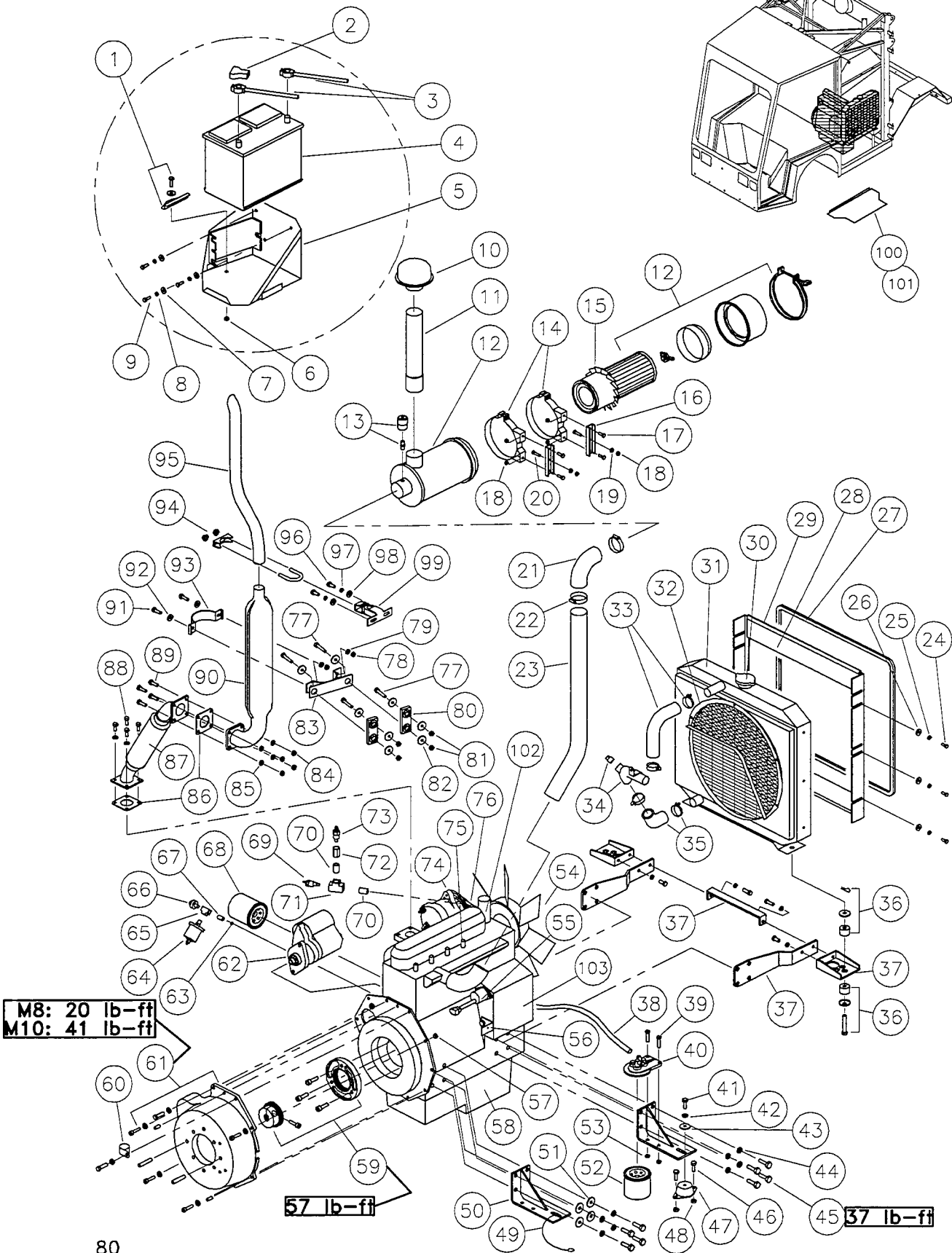
# ENGINE



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	26205	Battery hold down	1
2	6369	Battery boot	1
3	6377	Battery cable	2
4	6393	Battery	1
5	21475	Battery support and brake bracket	1
6		Jam nut 5/16"-18 UNC	1
7		Washer Dia. 1/4"	3
8		Lock washer Dia. 1/4"	3
9		Screw hex. head 1/4"-20 UNC X 3/4" Lg	3
10	8795	Air cleaner inlet hood	1
11	28391	Air intake tube	1
12	8752	Air cleaner assembly	1
13	8841	Air cleaner indicator and fitting	1
14	8760	Air cleaner bands	2
15	8892	Engine air filter element	1
16	1545	Air cleaner bracket	2
17		Screw hex. head 1/4"-20 UNC X 3/4" Lg	4
18		Lock nut 1/4"-20 UNC	6
19		Washer Dia 1/4"	2
20		Screw hex. head 1/4"-20 UNC X 1" Lg	2
21	8787	Air cleaner rubber elbow	2
22	9554	Clamp	4
23	28119	Air intake tube	1
24		Screw hex. head M6-16 mm	6
25		Lock washer #6	6
26		Washer #6	6
27	27384	Rubber radiator trim	1
28	27390	Rubber flap, radiator	2
29	21939	Radiator frame	1
30	27404	Radiator cap	1
31	27406	Radiator	1
32	27412	Fan guard	1
33	25266	Hose radiator (upper) and clamp	1
34	27767	Heater water pipe and plug	1
35	25268	Hose radiator (lower) and clamp	1
36	29191	Radiator cushion kit	1
37	27414	Radiator mount kit	1
38	25260	Hose fuel line (filter to injection pump)	1
39		Screw hex. head 5/16"-18 UNC X 1" Lg	2
40	27420	Fuel filter holder	1
41		Screw hex. head 3/8"-16 UNC X 3/4" Lg	4
42		Lock washer Dia. 3/8"	4
43		Washer Dia. 3/8"	4
44		Lock washer #10	16
45		Screw hex. head M10 X 1.25-35mm Lg, TORQUE: 37 lb-ft	16
46		Screw hex. head 5/16"-18 UNC X 3/4" Lg	8
47	9031	Engine vibration mount front	2
	29032	Engine vibration mount rear	2
48		Lock nut 5/16"-18 UNC	8
49	26394	Engine ground	1
50	2452	Engine support	4
51		Washer M10	8
52	9287	Fuel filter element	1
53		Lock nut 5/16"-18 UNC	2
54	27439	Diesel engine fan	1

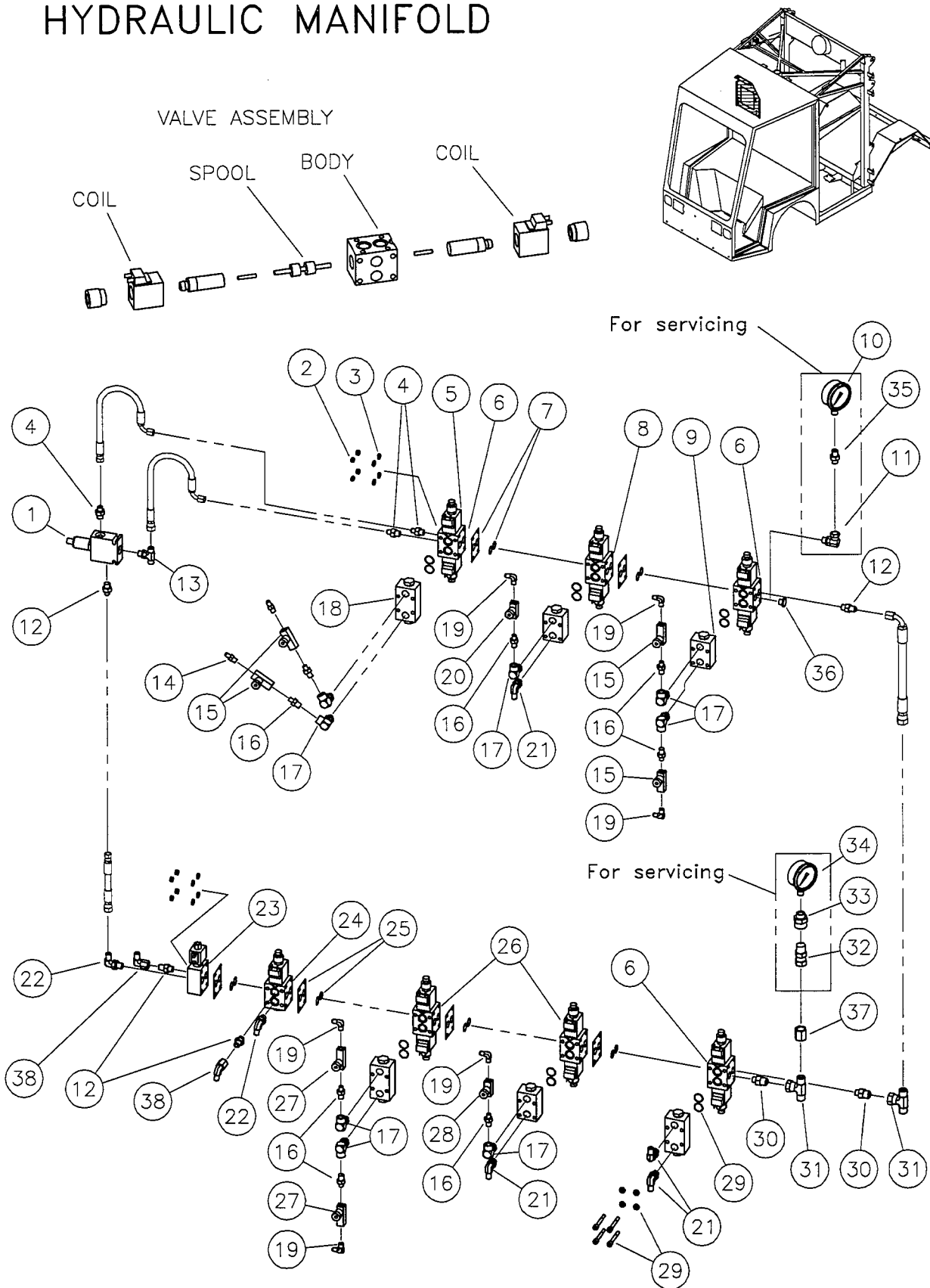


# ENGINE



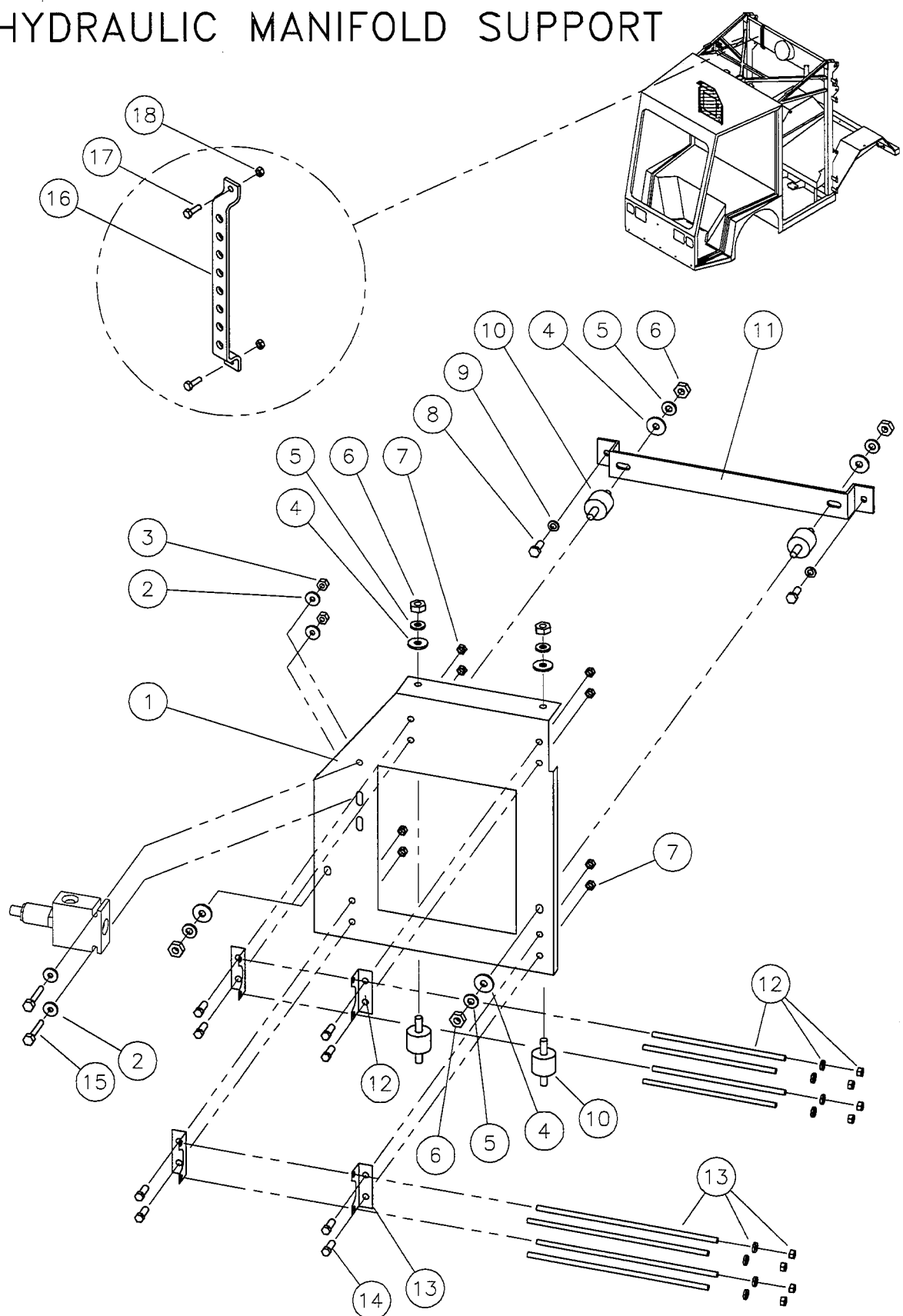
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
55	9305	Fuel shut off solenoid	1
56	2460	Engine throttle bracket	1
57		Lock nut M8 X 1.25	1
58	28168	Engine Diesel 231D	1
59	28265	Bowex coupling kit, TORQUE (M10): 57 lb-ft	1
60	27271	Clamp 11	1
61	28273	Flywheel housing, TORQUE: M8: 20 lb-ft, M10: 41 lb-ft	1
62	29113	Starter	1
63	25594	O-ring	1
64	6559	Oil pressure sender	1
65	25495	Fitting T	1
66	26011	Oil pressure switch	1
67	25436	Fitting	1
68	9295	Engine oil filter element	1
69	26378	Temperature switch	1
70	25290	Fitting	2
71	25592	Fitting T	1
72	25053	Fitting	1
73	6520	Temperature sender gauge	1
74	26380	Alternator	1
75	26386	Glow plug	4
76	27447	Fan belt	1
77		Screw hex. head 5/16"-18 UNC X 1 3/4 Lg	4
78		Jam nut 5/16"-18 UNC	2
79		Lock washer Dia. 5/16"	2
80	27198	Muffler support	2
81		Lock nut 5/16"-18 UNC	4
82		Washer Dia. 5/16"	8
83	28194	Hanging muffler clamp	1
84		Jam nut 5/16"-18 UNC	4
85		Lock washer Dia. 5/16"	8
86	27449	Exhaust manifold gasket	2
87	27455	Exhaust flexible coupling	1
88		Screw hex. head M8 X 1.25-20mm Lg	4
89		Screw hex. head 5/16"-18 UNC X 1" Lg	4
90	28176	Muffler	1
91		Screw hex. head 5/16"-18 UNC X 1" Lg	2
92		Washer Dia. 5/16"	2
93	28186	Muffler clamp	1
94	8094	Muffler clamp	1
95	28162	Tail Pipe	1
96		Screw hex. head 5/16"-18 UNC X 3/4" Lg	2
97		Lock washer Dia. 5/16"	2
98		Washer Dia. 5/16"	2
99	27196	Rubber muffler support	1
100	28356	Air deflector	1
101		Screw self tap 1/4"-20 UNC X 3/4" Lg	9
102	28575	Thermostat, engine	1
103	28567	Fuel pump	1

# HYDRAULIC MANIFOLD



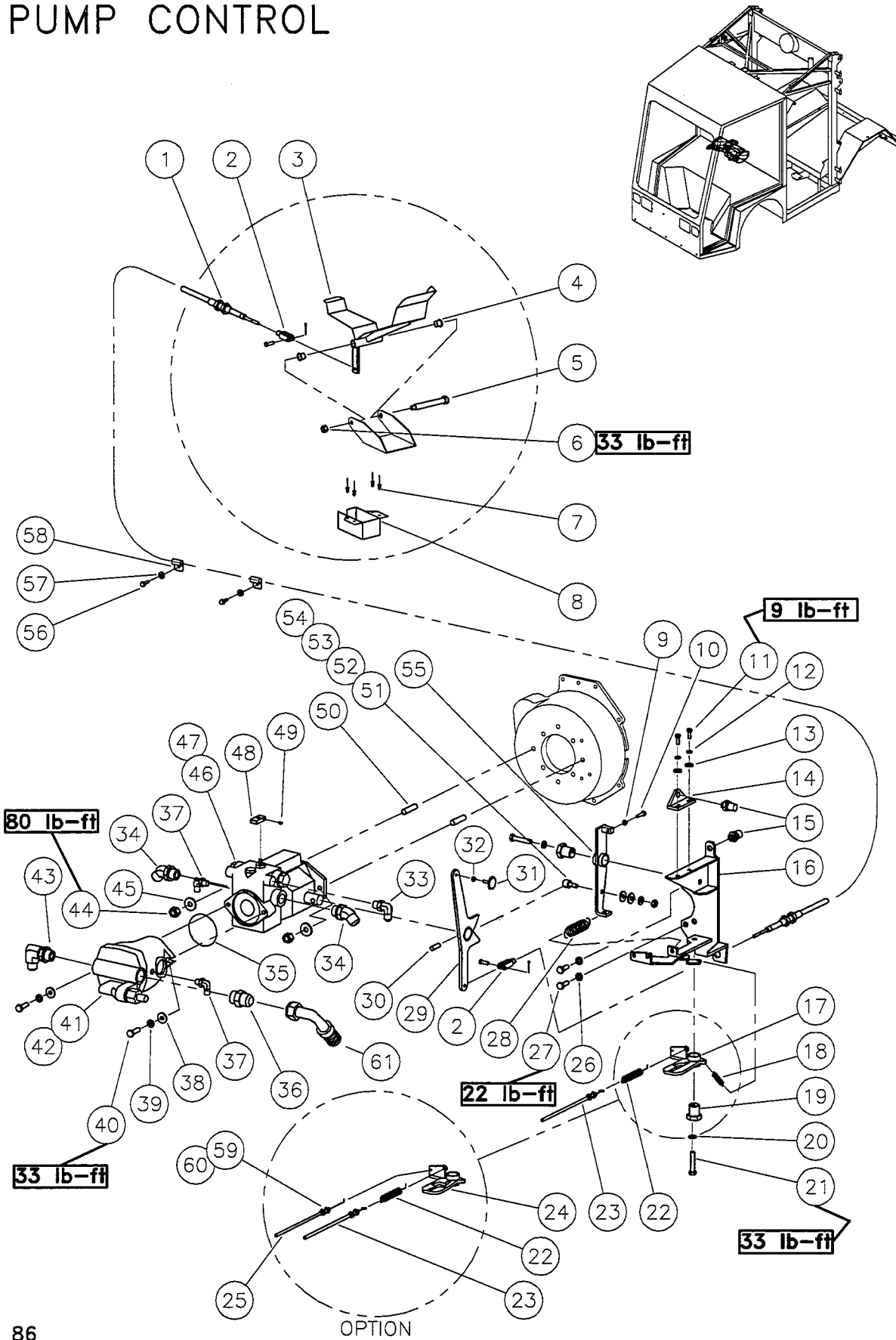
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	25134	Valve pressure reducing	1
2		Jam nut 1/4"-20 UNC	8
3		Lock washer Dia. 1/4"	8
4	25452	Fitting	3
5	25519	Coil	14
6	25541	Valve directionnal	3
7	24219	Mounting kit, arm	1
8	25543	Valve directionnal	1
9	24105	Single check module	3
10	25037	Low pressure gauge, for servicing	1
11	25460	Fitting, for servicing with gauge	1
12	4285	Fitting	4
13	25479	Fitting T	1
14	4242	Fitting	2
15	25098	Valve flow control	4
16	25487	Fitting	8
17	25489	Fitting 90	8
18	24316	Dual check module	3
19	25398	Fitting 90	6
20	25112	Valve needle	1
21	25452	Fitting 90	4
22	4420	Fitting 90	2
23	25497	Valve unloading	1
24	25509	Valve relief	1
25	24227	Mounting kit, container	1
26	25517	Valve directionnal	2
27	25511	Valve flow control	2
28	25400	Valve needle	1
29	24531	Mounting kit, manifold	6
30	25525	Fitting	2
31	25527	Fitting T	2
32	25533	Fitting, for servicing with gauge	1
33	25535	Fitting, for servicing with gauge	1
34	25029	High pressure gauge for servicing	1
35	25349	Fitting, for servicing with gauge	1
36	4323	Fitting	1
37	24499	Fitting	1
38	24324	Fitting	2
	25150	Manifold ass'y arm	1
	25169	Manifold ass'y container	1

# HYDRAULIC MANIFOLD SUPPORT



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	21416	Hydraulic Manifold support	1
2		Washer Dia. 1/4"	4
3		Lock nut 1/4"-20 UNC	2
4		Washer Dia. 5/16"	6
5		Lock washer Dia. 5/16"	6
6		Jam nut 5/16"-18 UNC	6
7		Lock nut 1/4"-20 UNC	8
8		Screw hex. head 1/4"-20 UNC X 1/2" Lg	2
9		Lock washer Dia. 1/4"	2
10	27058	Rubber mount	4
11	21769	Hyd manifold mounting bracket	1
12	24219	Mounting kit, arm	1
13	24227	Mounting kit, container	1
14		Screw hex. head 1/4"-20 UNC X 3/4" Lg	8
15		Screw hex. head 1/4"-20 UNC X 2" Lg	2
16	21718	Arm hydraulic hose support	1
17		Screw hex. head 1/4"-20 UNC X 3/4" lg	2
18		Lock nut 1/4"-20 UNC	2

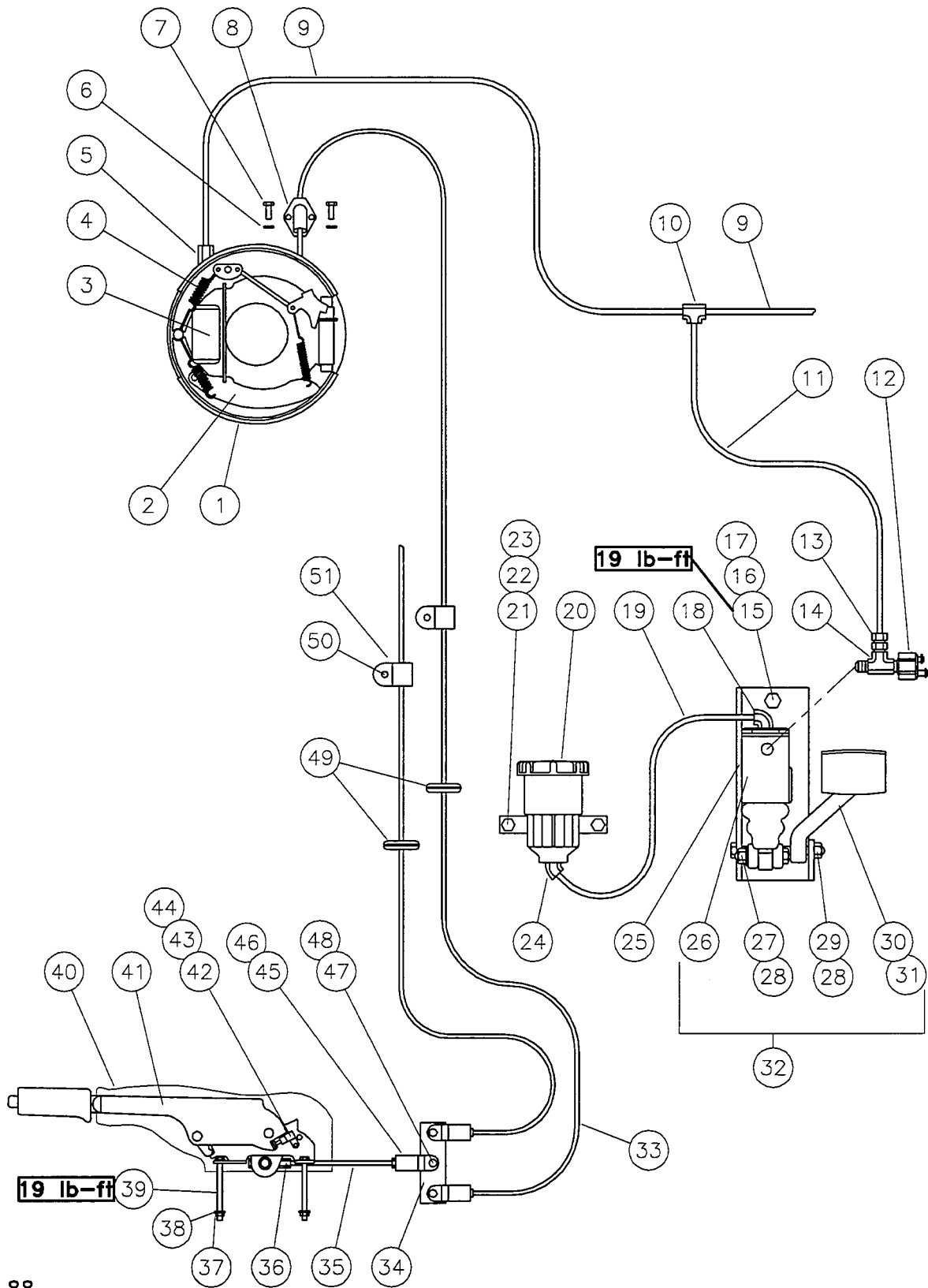
# PUMP CONTROL



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	28577	Traction cable	1
2	28281	Traction clevis	2
3	28001	Traction pedal	1
4	28214	Traction pedal bearing	2
5	28311	Traction pedal pivot, TORQUE: 33 lb-ft	1
6		Locknut 3/8"-16 UNC	1
7		Pop rivet	4
8	21058	Traction pedal cover	1
9		Jam nut 1/4"-20 UNC	1
10		Screw hex. head 1/4"-20 UNC X 1 1/4" Lg	1
11		Screw hex. head 1/4"-20 UNC X 3/4" Lg, TORQUE: 9 lb-ft	2
12		Lock washer Dia. 1/4"	2
13		Washer Dia 1/4"	2
14	28480	Back-up switch bracket	1
15	26062	Back-up & neutral switch	2
16	28496	Control bracket	1
17	28569	2 pos. transmission shifter plate	1
18	7322	Shifter spring	1
19	28437	Pump lever adjustment bushing	2
20		Lock washer Dia. 3/8"	2
21		Screw hex. head 3/8"-16 UNC X 2" Lg, TORQUE: 33 lb-ft	1
22	28526	Transmission shifter spring	1
23	28534	Transmission brake cable	1
24	28518	3 pos. transmission shifter plate (option)	1
25	28561	Shift cable (option)	1
26		Lockwasher Dia. 3/8"	3
27		Screw hex. head 3/8"-16 UNC X 1" Lg, TORQUE: 22 lb-ft	3
28	28593	Pump lever spring	1
29	28445	Pump lever 231	1
30	28338	Spring pin	1
31	28488	Back-up adjustment screw	1
32		Jam nut 1/4"-20 UNC	1
33	4439	Fitting 90	1
34	25004	Fitting 45	2
35	5036	O'ring-pump	1
36	25039	Fitting	1
37	4420	Fitting 90	2
38		Washer Dia. 3/8"	2
39		Lock washer Dia. 3/8"	2
40		Screw hex head 3/8"-16 X 1 1/2" Lg, TORQUE: 33 lb-ft	2
41	25010	Pressure comp. piston pump	1
42	25082	Seal kit hydraulic pump	
43	4390	Fitting 90	1
44		Locknut 1/2-13 UNC, TORQUE: 80 lb-ft	2
45		Washer dia. 1/2"	2
46	25002	Hydrostatic pump	1
47	25063	Seal kit hydrostatic pump	
48	28585	Neutral lever	1
49		Screw hex. socket, cup point 1/4"-20 UNC X 1/4" Lg	1
50	28346	Stud	2
51	7527	Cam follower	1
52		Jam nut 3/8"-24 UNF	1
53		Lock washer dia. 3/8"	1
54		Washer dia. 3/8"	2
55	28472	Cam lever	1
56		Srew self tap hex. head 1/4"-20 UNC X 3/4" Lg	2
57		Washer Dia. 1/4"	2
58	27668	Clamp 6	2
59		Jam nut 5/16-24 UNF	2
60		Lock washer serrated 5/16	2
61	24553	Fitting 90	1

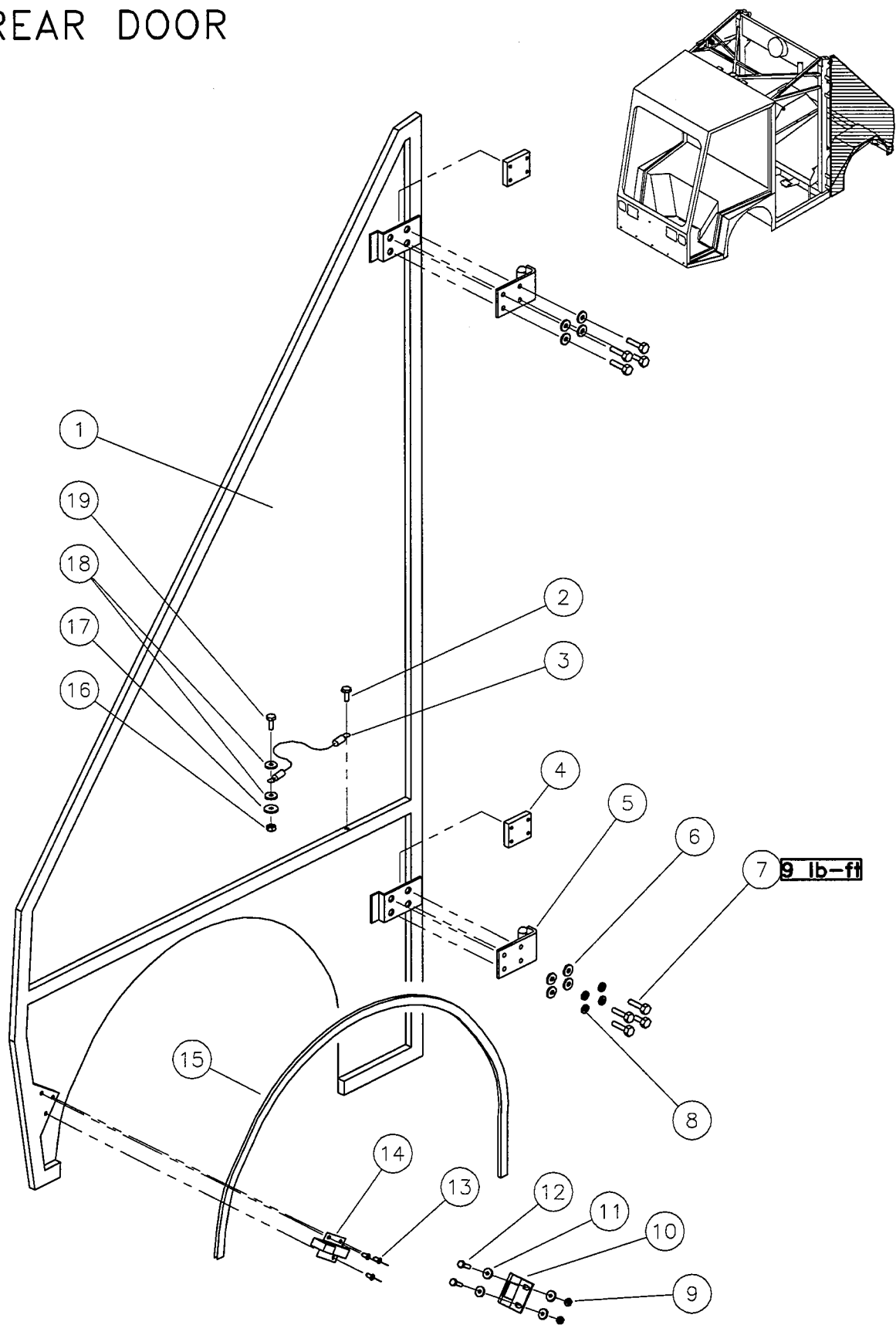


# BRAKING SYSTEM



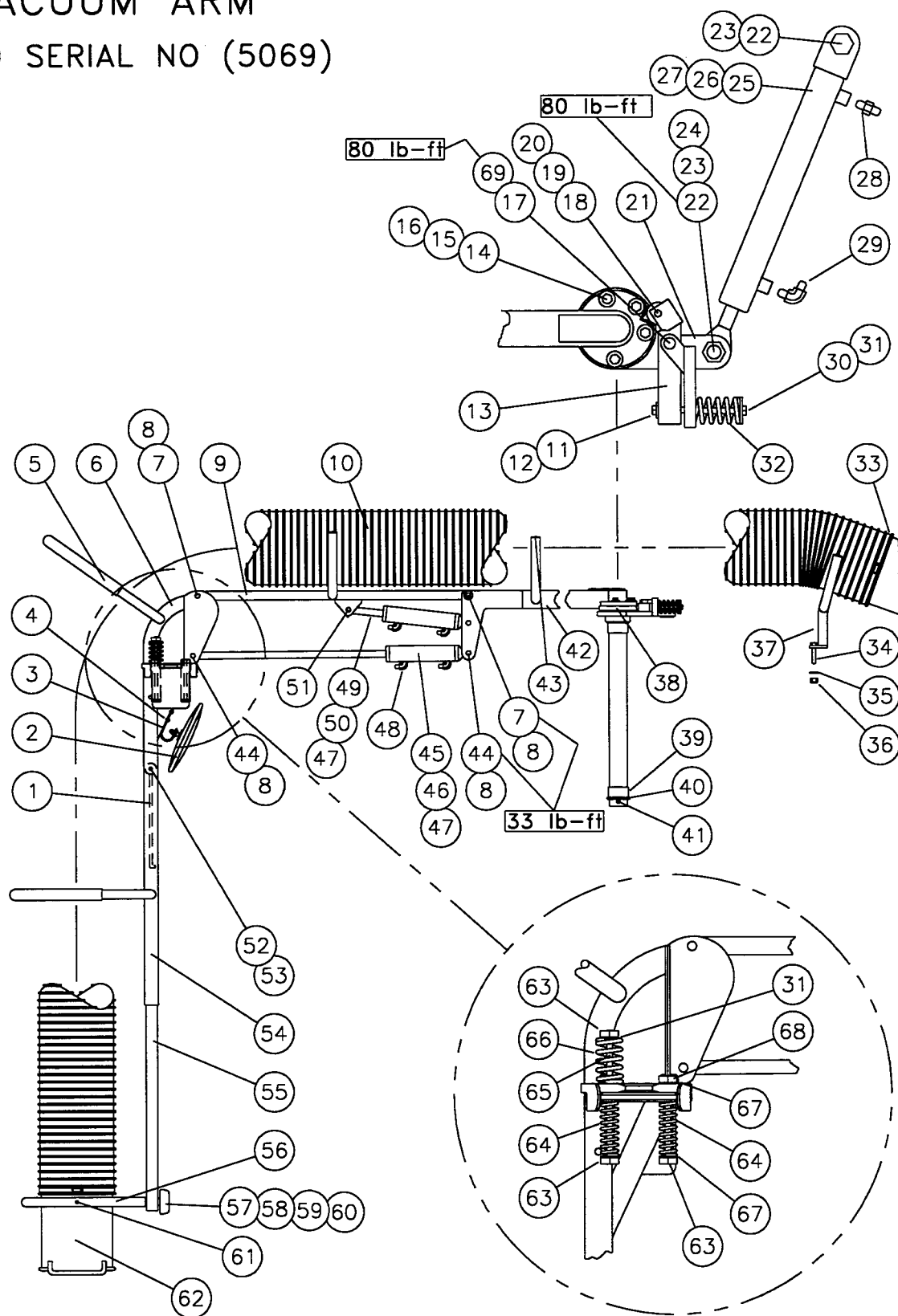
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	27048	Brakes L/H	1
	27056	Brakes R/H	1
2	28028	Brake pads replacement kit	
3	28036	Brake piston replacement kit	
4	27471	Spring kit	1
5	25371	Fitting	2
6		Lock washer Dia. 8mm	4
7		Screw hex. head M8-20 mm	4
8	28097	Brake cable support	2
9	24900-M	Hose assembly	2
10	25373	Fitting T	1
11	24922-M	Hose assembly	1
12	26408	Brake light switch	1
13	4242	Fitting	1
14	25392	Fitting T	1
15		Screw hex. head 5/16"-18 UNC X 1" Lg, TORQUE: 19 lb-ft	2
16		Washer Dia. 5/16"	2
17		Lock nut 5/16"-18 UNC	2
18	25398	Fitting 90	1
19	24930-M	Hose assembly	1
20	28257	Brake fluid reservoir	1
21		Screw hex. head 1/4"-20 UNC X 1/2" Lg	2
22		Lock washer Dia. 1/4"	2
23		Washer Dia. 1/4"	2
24	4463	Fitting 45	1
25	28348	Brake pedal mounting plate	1
26	28230	Seal kit brake pedal	
27		Screw hex. head 3/8"-24 UNF X 2 1/4" Lg	1
28		Lock nut 3/8"-24 UNF	2
29		Screw hex. head 3/8"-24 UNF X 4" Lg	1
30	28249	Brake pedal lever and piston	1
31	27473	Brake pedal cover	1
32	28222	Brake pedal assembly	1
33	28510	Hand brake cable	2
34	28089	Brake cable equalizer	1
35	21998	Hand brake threaded rod	1
36	27492	Coupling nut	2
37		Lock nut 5/16"-18 UNC	2
38		Washer Dia. 5/16"	4
39		Screw Hex. head 5/16"-18 UNC X 2 3/4" Lg, TORQUE: 19 lb-ft	2
40	28125	Hand brake cover	1
41	27498	Hand brake ratchet lever	1
42	26068	Hand brake switch	1
43		Screw hex. head 10-32 UNF X 3/4" Lg	1
44		Lock nut 10-32 UNF	1
45	27500	Clevis	1
46		Jam nut 5/16"-18 UNC	2
47	27501	Clevis pin dia. 3/8" X 7/8" Lg	3
48		Cutter pin	3
49	27597	Grommet	2
50		Pop rivet	2
51	27688	Clamp 6	2

# REAR DOOR



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	21291	Rear door Left	1
	21290	Rear door Right	1
2		Screw self tap hex. head 1/4"-20 UNC X 3/4"	2
3	21548	Rear door retaining cable	2
4	21734	Hinge back plate	4
5	21728	Engine door hinge L	2
	21726	Engine door hinge R	2
6		Washer Dia. 1/4"	16
7		Screw hex. head 1/4"-20 UNC X 3/4" Lg, TORQUE: 9 lb-ft	16
8		Lock washer Dia. 1/4"	16
9		Lock nut 1/4"-20 UNC	4
10	21311	Rear door Strike	2
11		Washer Dia. 1/4"	8
12		Screw hex. head 1/4"-20 UNC X 3/4 Lg	4
13		Pop rivet	6
14	28079	Latch rear door pannel	2
15	27675	Trim, rear door	2
16		Lock nut 1/4"-20 UNC	2
17		Washer Dia. 1/4"	2
18		Washer Dia. 1/4"	4
19		Screw hex. head 1/4"-20 UNC X 3/4" Lg	2

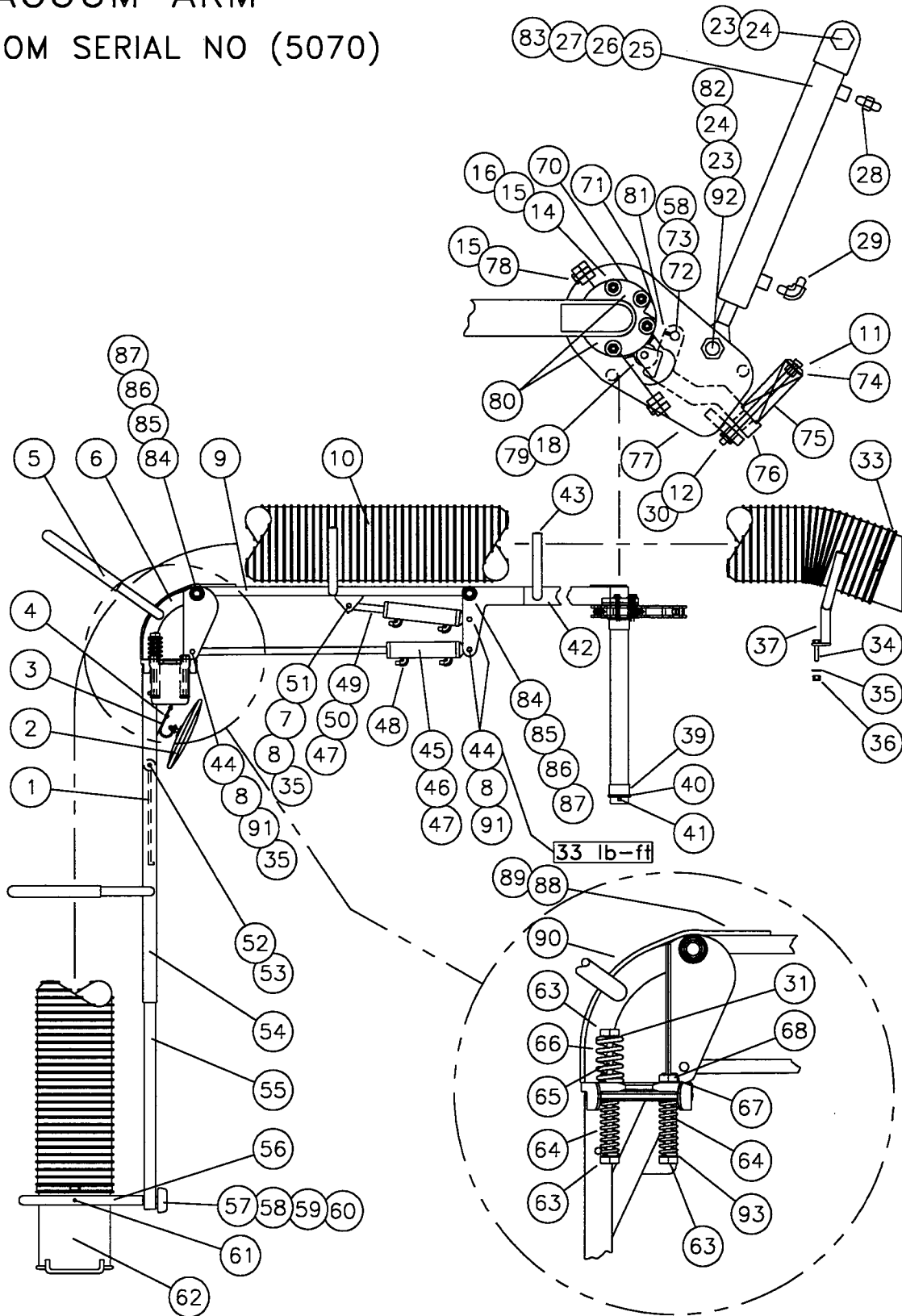
# VACUUM ARM TO SERIAL NO (5069)



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	23691	Sliding tube stroke stopper	1
2	29024	Mirror head convex	1
3	23214	Arm mirror support	1
4		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	2
5	27137	Hose clear vinyl	2
6	23745	Lower arm elbow	1
7	29229	Screw shoulder 1/2" X 3" Lg 3/8"-16 UNC, TORQUE: 33 lb-ft	2
8		Lock nut 3/8"- 16 UNC	6
9	23907	Intermediate arm	1
10	27050	Hose 8" clear	1
	27190	Hose 8" heavy duty (option)	
11		Screw hex. head 5/16"-18 UNC X 6" Lg	1
12	27643	Washer self aligning	1
13	23721	Arm lever	1
14		Screw hex. head 5/16"-18 UNC X 1 1/4" Lg, TORQUE: 19 lb-ft	4
15		Lock washer Dia. 5/16"	4
16		Washer Dia. 5/16"	4
17	27503	Screw shoulder 5/8" X 1 1/4" Lg 1/2"-13 UNC, TORQUE: 80 lb-ft	1
18	28302	Cam follower	1
19		Screw hex. head 3/8"-16 UNC X 2" Lg	1
20		Lock nut 3/8"-16 UNC	1
21	23729	Arm rotation lever II	1
22		Screw hex. head 3/4"-10 UNC X 2 1/2" Lg, TORQUE: 80 lb-ft	2
23		Lock nut 3/4"-10 UNC	2
24		Washer Dia. 3/4"	1
25	5184	Arm cylinder R/L	1
26	5338	Seal kit arm cylinder R/L	
27	27465	Spherical ball bushing	2
28	25586	Fitting	1
29	4382	Fitting 90	1
30		Lock nut 5/16"-18 UNC	1
31	23379	Spring locator	3
32	28362	Spring cam lever	1
33	8507	Clamp	2
34		Screw hex. head 3/8"-16 UNC X 2" Lg	2
35		Washer Dia. 3/8"	2
36		Lock nut 3/8"-16 UNC	2
37	21033	Hose support	1
38	23861	Main arm rotation cam	1
39	23559	Bushing post	3
40	23753	Arm pivot washer	1
41	27536	Spring pin 3/8" X 2 1/2" Lg	1
42	23346	Main Arm	1
43	27546	Tubing plug	8
44	27751	Screw shoulder 1/2" X 2 1/2" Lg 3/8"-16 UNC, TORQUE: 33 lb-ft	4
45	24865	Arm cylinder F/B	1
46	5338	Seal kit arm cylinder F/B	
47	27749	Spherical ball bushing	4
48	4463	Fitting 45	4
49	24857	Arm cylinder U/D	1
50	5338	Seal kit arm cylinder U/D	
51	28170	Arm cylinder spacer	8
52	27538	Clevis pin 5/16" X 2" Lg	1
53	27544	Hitch pin clip	1
54	23737	Lower arm	1
55	23602	Sliding Tube	1
56	23605	Inlet Holder	1
57		Screw hex head 1/2"-13 UNC X 4 1/2" Lg	1
58		Washer Dia. 1/2"	1
59		Locknut 1/2"-13 UNC	1
60	7683	Rubber bumper	1
61		Screw hex. head 5/16"-18 UNC X 3/4" Lg	2
62	23419	Inlet	1
63		Locknut 5/16"-18 UNC	6
64	28133	Spring lower arm	4
65	23387	Rod 5/16"-18 UNC X 7 1/4" Lg	2
66	28141	Spring lower arm elbow	2
67		Washer	6
68		Screw hex head 5/16"-18 UNC X 4 1/2" Lg	2
69		Jam nut 1/2"-13 UNC	1

# VACUUM ARM

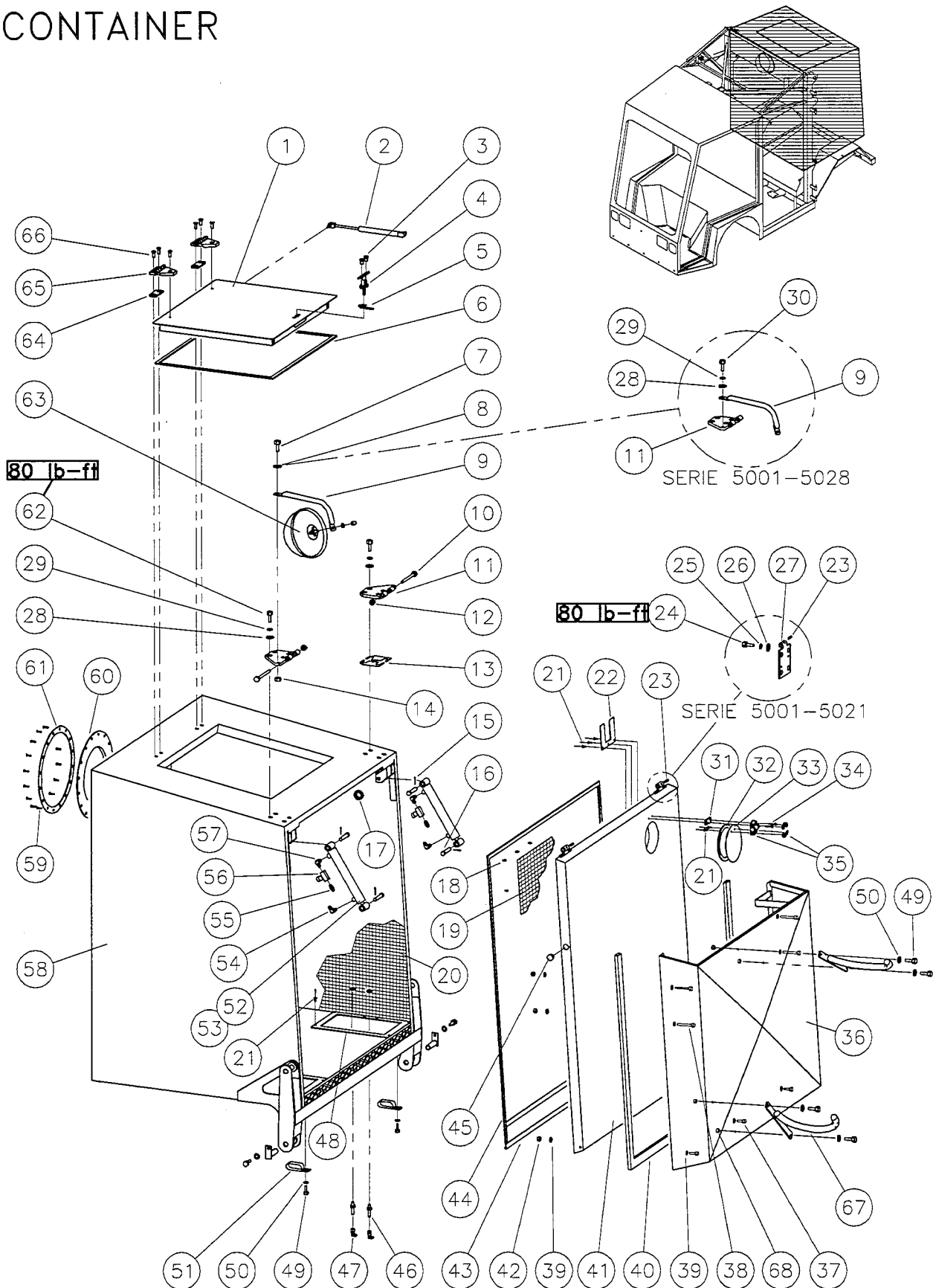
FROM SERIAL NO (5070)



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	23691	Sliding tube stroke stopper	1
2	29024	Mirror head convex	1
3	23214	Arm mirror support	1
4		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	2
5	27137	Hose keeper	2
6	23745	Lower arm elbow	1
7	29229	Screw shoulder 1/2" X 2" Lg 3/8"-16 UNC, TORQUE: 33 lb-ft	1
8		Lock nut 3/8"- 16 UNC	4
9	23907	Intermediate arm	1
10	27050	Hose 8" clear	1
	27190	Hose 8" heavy duty (option)	
11		Screw hex. head 5/16"-18 UNC X 6" Lg	1
12	27643	Washer self aligning	1
14		Screw hex. head 5/16"-18 UNC X 2" Lg, TORQUE: 19 lb-ft	4
15		Lock washer Dia. 5/16"	6
16		Washer Dia. 5/16"	4
18	28302	Cam follower	1
23		Lock nut 3/4"-10 UNC	2
24		Washer Dia. 3/4"	1
25	5184	Arm cylinder R/L	1
26	5338	Seal kit arm cylinder R/L	
27	27465	Spherical ball bushing	2
28	25586	Fitting	1
29	4382	Fitting 90	1
30		Lock nut 5/16"-18 UNC	1
31	23379	Spring locator	2
33	8507	Clamp	2
34		Screw hex. head 3/8"-16 UNC X 2" Lg	2
35		Washer Dia. 3/8"	4
36		Lock nut 3/8"-16 UNC	2
37	21033	Hose support	1
39	23559	Bushing post	2
40	23753	Arm pivot washer	1
41	27536	Spring pin 3/8" X 2 1/2" Lg	1
42	23346	Main Arm	1
43	27546	Tubing plug	8
44	27751	Screw shoulder 1/2" X 2 1/2" Lg 3/8"-16 UNC, TORQUE: 33 lb-ft	3
45	24865	Arm cylinder F/B	1
46	5338	Seal kit arm cylinder F/B	
47	27749	Spherical ball bushing	4
48	4463	Fitting 45°	4
49	24857	Arm cylinder U/D	1
50	5338	Seal kit arm cylinder U/D	
51	28170-2	Arm cylinder spacer	2
52	27538	Clevis pin 5/16" X 2" Lg	1
53	27544	Hitch pin clip	1
54	23737	Lower arm	1
55	23602	Sliding Tube	1
56	23605	Inlet Holder	1
57		Screw hex head 1/2"-13 UNC X 4 1/2" Lg	1
58		Washer Dia. 1/2"	3
59		Locknut 1/2"-13 UNC	1
60	7683	Rubber bumper	1
61		Screw hex. head 5/16"-18 UNC X 3/4" Lg	2
62	23419	Inlet	1
63		Locknut 5/16"-18 UNC	6
64	28133	Spring lower arm	4
65	23387	Rod 5/16"-18 UNC X 7 1/4" Lg	2
66	28141	Spring lower arm elbow	2
67		Washer Dia. 5/16"	6
68		Screw hex head 5/16"-18 UNC X 4 1/2" Lg	2
70	23611	Cam	1
71	23603	Cam spacer	1
72	23727	Car roller lever pivot	1
73		Cotter pin dia 1/8"	1
74	23638	Spring locator	1
75	28591	Spring cam lever	1
76	23654	Cam roller lever ass'y	1
77	23662	Arm rotation lever III	1
78		Screw hex head 5/16"-18 UNC X 1" Lg	2
79	23646	Roller axle	1
80		Grease fitting	2
81		Grease fitting 90°	1
82		Washer dia 3/4 CC	2
83	23689	Cylinder rod stopper	1
84	23565	Main arm axle	2
85		Main arm spherical bearing	4
86	23573	Spherical bearing shield	4
87		Spring pin 1/8" x 1 1/2"	4
88		Pop rivet 3/16" x 1/2"	2
89		Washer #10	2
90	23506	Lower arm elbow mat	1
91	28170-1	Arm cylinder spacer	6
92	23719	Cylinder bolt	1
93	23492	Spring locator	4

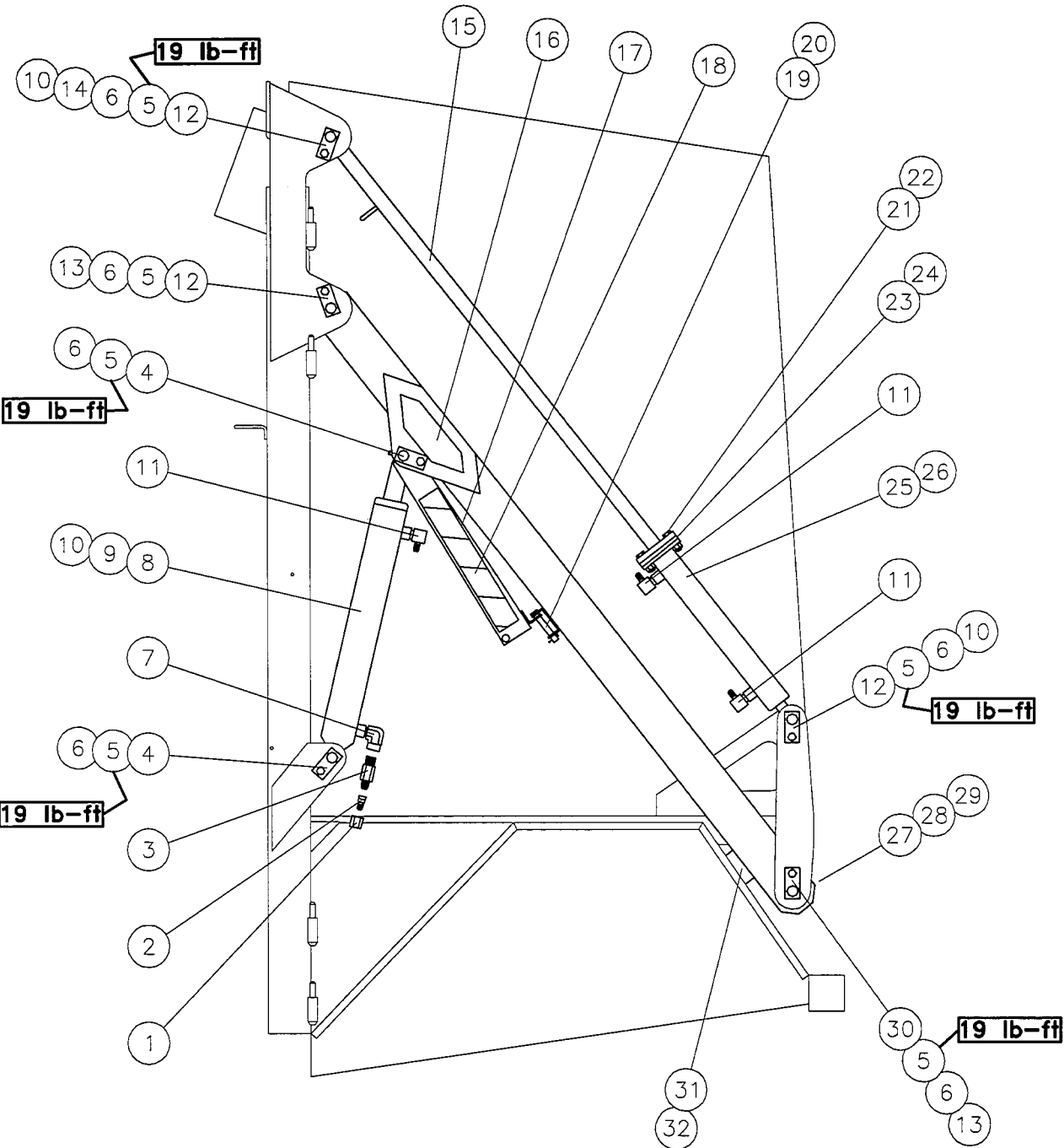


# CONTAINER



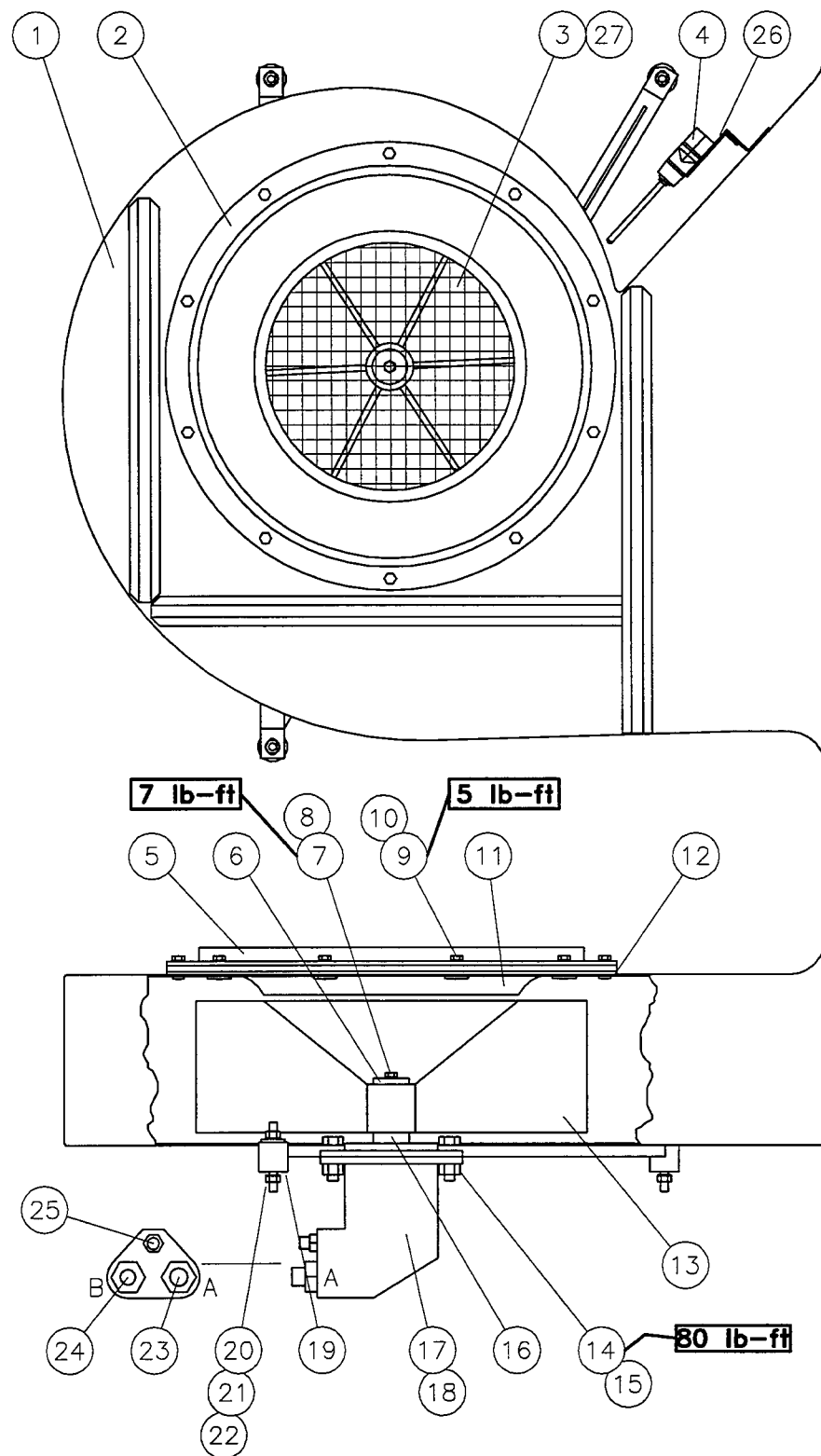
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	23942	Container top door	1
2	28087	Container door gas spring	1
3		Screw round head square drive 1/4"-20 UNC X 1/2" Lg	2
4	28109	Container top door handle	1
5	28117	Container top door lock	1
6	27023	Seal container top	1
7		Screw hex. head 3/8"-16 UNC X 1 1/4" Lg	1
8		Washer Dia. 3/8"	1
9	21680	Rear mirror support	1
10		Screw hex. head 3/8"-16 UNC X 4 1/2" Lg	2
11	23886	Container hinge RH	1
	23885	Container hinge LH	1
12		Lock nut 3/8"-16 UNC	2
13	29085	Container hinge spacer	2
14		Lock nut 3/8"-16 UNC	1
15		Cutter pin	4
16	27522	Clevis pin dia. 1/2" X 2 3/4" Lg	4
17	27597	Grommet	2
18	27617	Liner snap pin	
19	23551	Container door liner	1
20	23470	Container liner	1
21		Pop rivet	17
22	29174	Container door dust cover	2
23		Grease fitting 1/4"-28 UNF	2
24		Screw hex. head 1/2"-20 UNF X 1 1/4" LG, TORQUE: 80 lb-ft	8
25		Lock washer Dia. 1/2"	8
26		Washer Dia. 1/2"	8
27	23915	Container door hinge	2
28		Washer Dia. 1/2"	1
29		Lock washer Dia. 1/2"	1
30		Screw hex. head 1/2"-20 UNF	1
31	23950	Spacer flap door	1
32	27619	Seal Container 5" Flap	1
33	23152	5" extension Flap	1
34		Screw hex. head 10-32 UNF X 3/4" Lg	2
35	27188	Extension flap hinge	1
36	29166	5" extension box (option)	1
	29148	8" extension box (option)	1
37		Screw hex. head 5/16"-18 UNC X 1" Lg (option)	3
38		Screw hex. head 5/16"-18 UNC X 2 1/2" Lg (option)	4
39		Washer Dia. 5/16" (option)	14
40	27765	Container extension box seal (option)	1
41	23893	Container door	1
42		Lock nut 5/16"-18 UNC	7
43	27015	Container door seal bottom	2
44	27007	Container door seal	1
45	27552	Plug button	2
46	25401	Fitting	4
47	25403	Fitting 90	4
48	23923	Container access door	2
49		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	6
50		Washer Dia. 1/4"	6
51	25233	Clamp 29	2
52	24760	Container door cylinder	2
53	25047	Seal kit container door cylinder	
54	25398	Fitting 90	2
55	4242	Fitting	2
56	25400	Valve needle	2
57	4358	Fitting 90	2
58	23011	Container	1
59		Screw flat head square drive 10-32 UNF X 3/4" Lg	16
60		Container seal II	1
61	23516	Container seal ring	1
62		Screw hex. head 1/2"-20 UNF X 1 1/4" Lg, TORQUE: 80 lb-ft	8
63	27554	Convex mirror	1
64	23958	Container top door hinge spacer	2
65	28095	Container top door hinge	2
66		Screw flat head phillips drive 5/16"-18 UNC X 1"	6
67	29090	8" extension holder ass'y (option)	2
68		Lock nut 1/4-20 UNC	4

# CONTAINER LIFT ARM



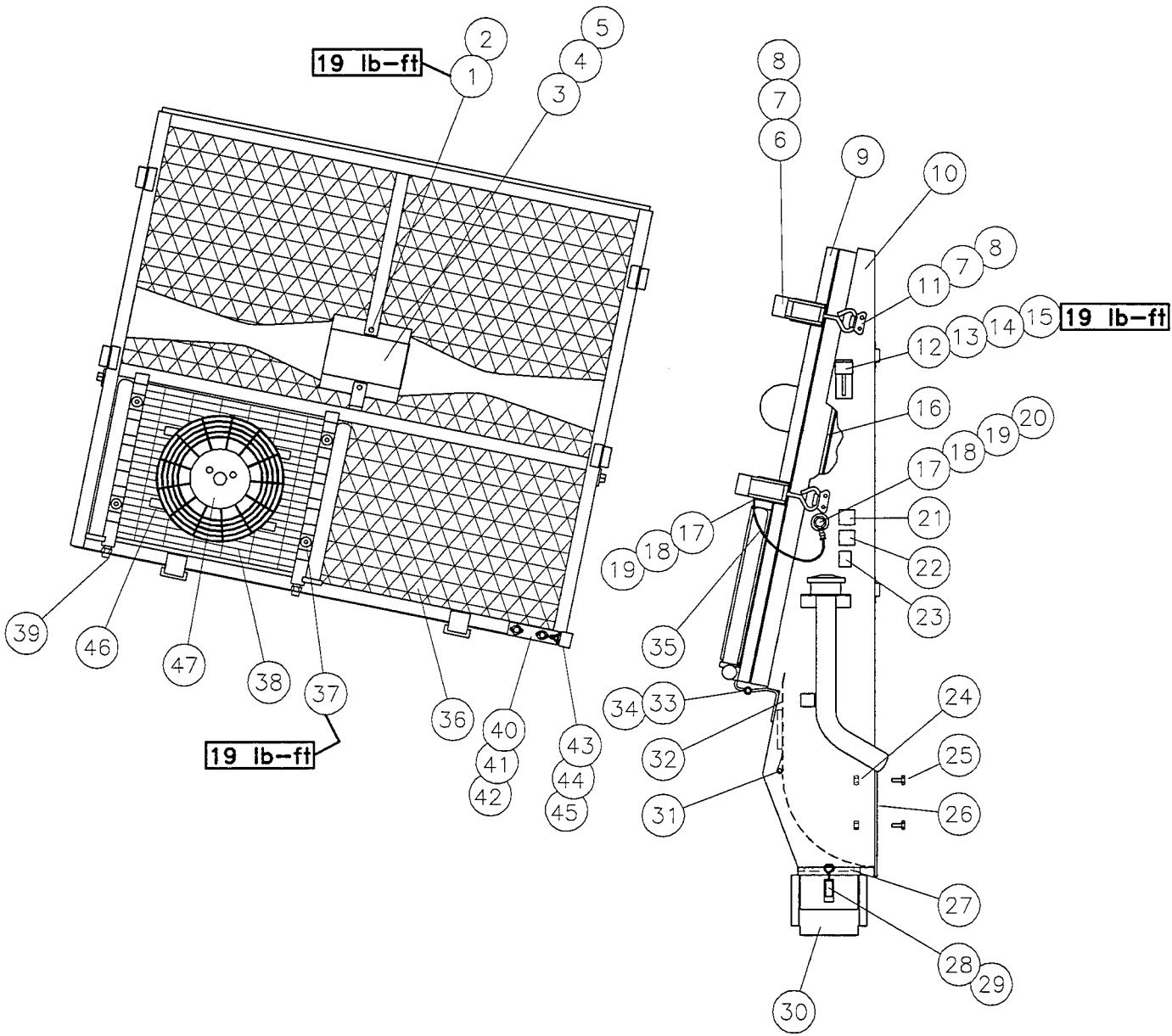
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	25422	Fitting	2
2	25428	Fitting	2
3	25179	Fuse	2
4	23096	Lift Pivot Pin	4
5		Screw hex. head 5/16"-18 UNC X 1/2" Lg, TORQUE: 19 lb-ft	12
6		Lock washer Dia. 5/16"	12
7	25438	Fitting 90	2
8	24768	Container lift cylinder	2
9	25031	Seal kit container lift	
10	27465	Spherical ball bushing	8
11	25444	Fitting 90	6
12	23095	Lift pivot pin	6
13	28184	Lower lift arm bushing	4
14	28192	Upper lift arm ball bushing	2
15	23087	Upper Lift Arm	2
16	23079	Lower Lift Arm	1
17	28208	Lift cylinder safety stopper	2
18	27686	Decal - Stripped sticker	2
19	27522	Clevis pin Dia. 1/2" X 2 3/4" Lg	2
20	27544	Hitch pin clip	2
21		Screw hex. head 3/8"-16 UNC X 1 3/4" Lg	8
22		Lock nut 3/8"-16 UNC	8
23	23109	Dump Cylinder Spacer (11 GA)	A/R
24	23110	Dump Cylinder Spacer (16 GA)	A/R
25	24752	Container dump cylinder	2
26	5338	Seal kit dump cylinder	
27	27759	Clamp 14	2
28		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	2
29		Washer Dia. 1/4"	2
30	23097	Lift Pivot Pin	2
31	29034	Lower lift arm stopper	2
32		Screw flat head square drive 1/4"-20 UNC X 1 1/4" Lg	4

# FAN CASING



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	23044	Fan casing	1
2	23494	Casing seal ring	1
3	23772	Air guide screen.	1
4	6601	Switch (safety vacuum fan)	1
5	23158	Casing seal II	1
6	23656	Fan top plug	1
7		Screw hex head M6 X 35mm Lg, TORQUE: 7 lb-ft	1
8		Lockwasher Dia. 1/4"	1
9		Screw hex head 5/16"-18 UNC X 1" Lg, TORQUE: 5 lb-ft	10
10		Lockwasher Dia. 5/16"	10
11	23071	Fan casing air guide	1
12		Rubber band	1
13	23478	Fan	1
14		Screw hex.head 1/2"-13 UNC X 2" Lg, TORQUE: 80 lb-ft	2
15		Lock nut 1/2"-13 UNC	2
16	23648	Fan bushing	1
17	24006	Fan motor	1
18	25481	Fan motor seal kit	
19	27058	Rubber mount	3
20		Jam nut 5/16"-18 UNC	6
21		Lock washer Dia. 5/16"	6
22		Washer Dia. 5/16"	6
23	25446	Fitting A	1
24	4773	Fitting B	1
25	4285	Fitting	1
26	9791	Bracket alarm switch	1
27	29237	Trim, air guide screen	1

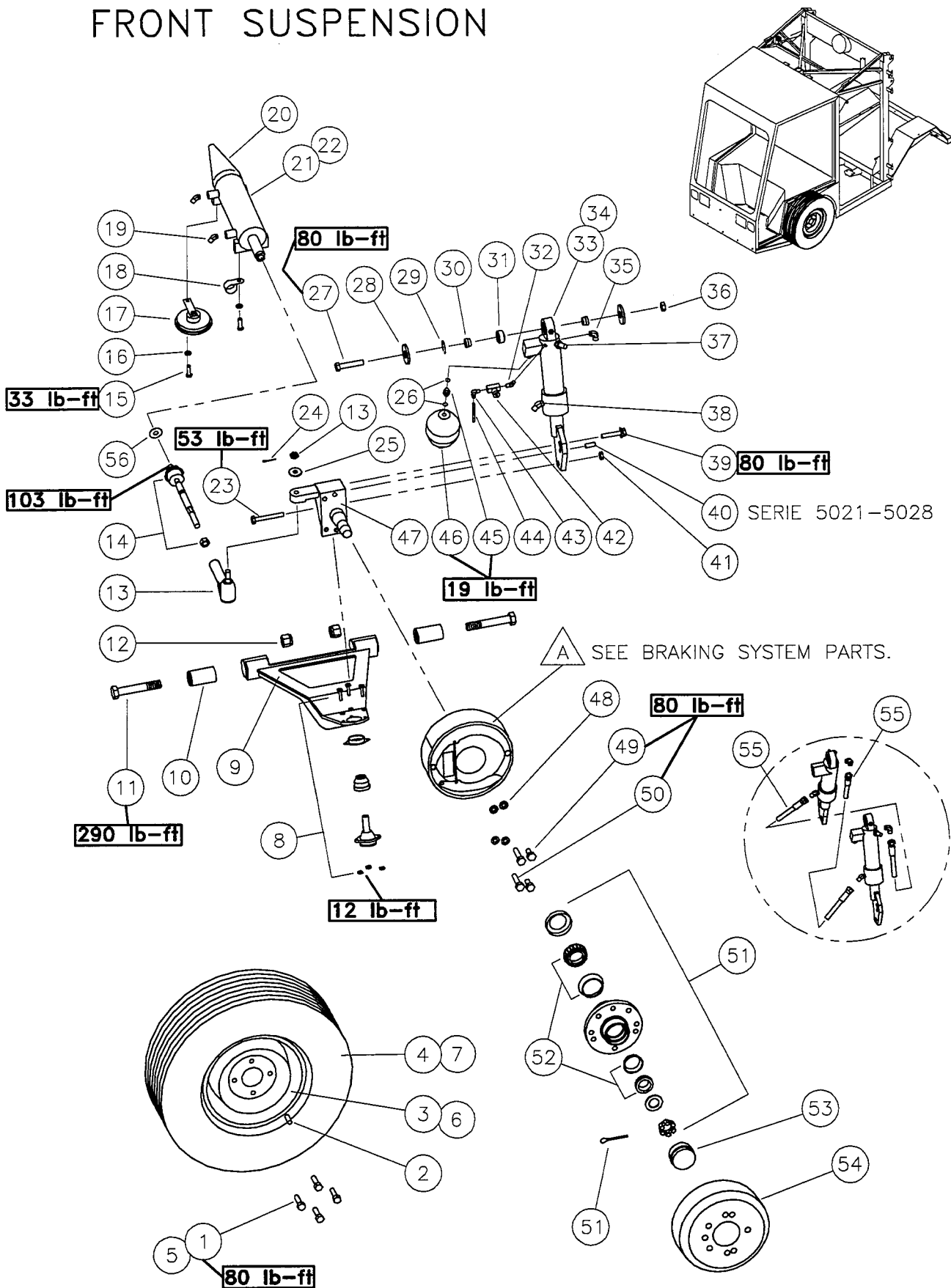
VACUUM FILTER



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1		Screw hex. head 5/16"-18 UNC X 1/2" Lg, TORQUE: 19 lb-ft	2
2		Lock washer Dia. 5/16"	2
3	23292	Vibrator motor clamp	1
4	26335	Vibrating motor	1
5	23184	Eccentric weight	1
6	27560	Latch filter holder	4
7		Screw flat head square drive 10-32 UNF X 3/4" Lg	20
8		Lock nut 10-32 UNF	20
9	23966	Filter holder	1
10	23125	Filter duct	1
11	27579	Hook filter holder	4
12	27058	Rubber mount	2
13		Washer Dia. 5/16"	4
14		Lock washer Dia. 5/16"	4
15		Jam nut 5/16"-18 UNC, TORQUE: 19 lb-ft	4
16	27635	Seal filter	1
17		Screw hex. head 1/4"-20 UNC X 1" Lg	2
18		Lock nut 1/4"-20 UNC	2
19		Washer Dia. 1/4"	4
20		Washer Dia. 1/4" (3/8" BB)	1
21	8485	Decal-warning hydraulic pressure (filter duct)	1
22	8493	Decal- refueling safety (filter duct)	1
23	9228	Decal- Diesel fuel (filter duct)	1
24		Lock nut 1/4"-20 UNC	10
25		Screw hex. head 1/4"-20 UNC X 3/4" Lg	10
26	27641	Filter duct seal	1
27	27633	Seal dust bucket	1
28	27368	Latch	1
29		Pop rivet	2
30	23133	Dust Bucket	1
31	27581	Spring pin	2
32	23206	Dust Flap	1
33		Screw hex. head 7/16"-14 UNC X 5" Lg	2
34		Lock nut 7/16"-14 UNC	2
35	21548	Duct filter retaining cable	1
36	23265	Filter	1
37	27064	Oil cooler support kit, TORQUE (5/16"-18 UNC X 2" Lg): 19 lb-ft	2
38	5702	Hydraulic oil cooler	1
39	5788	Fitting	2
40	23395	Radiator stopper bracket	1
41		Screw seft tapping 1/4"-20 UNC X 1/2 Lg	2
42		Flat washer	2
43	27670	Rubber mount	1
44		Jam nut 5/16"-18 UNC	1
45		Lock washer 5/16	1
46	26653	Cooling fan 231 and brackets	1
47	9724	Cooling fan tie-rods	2

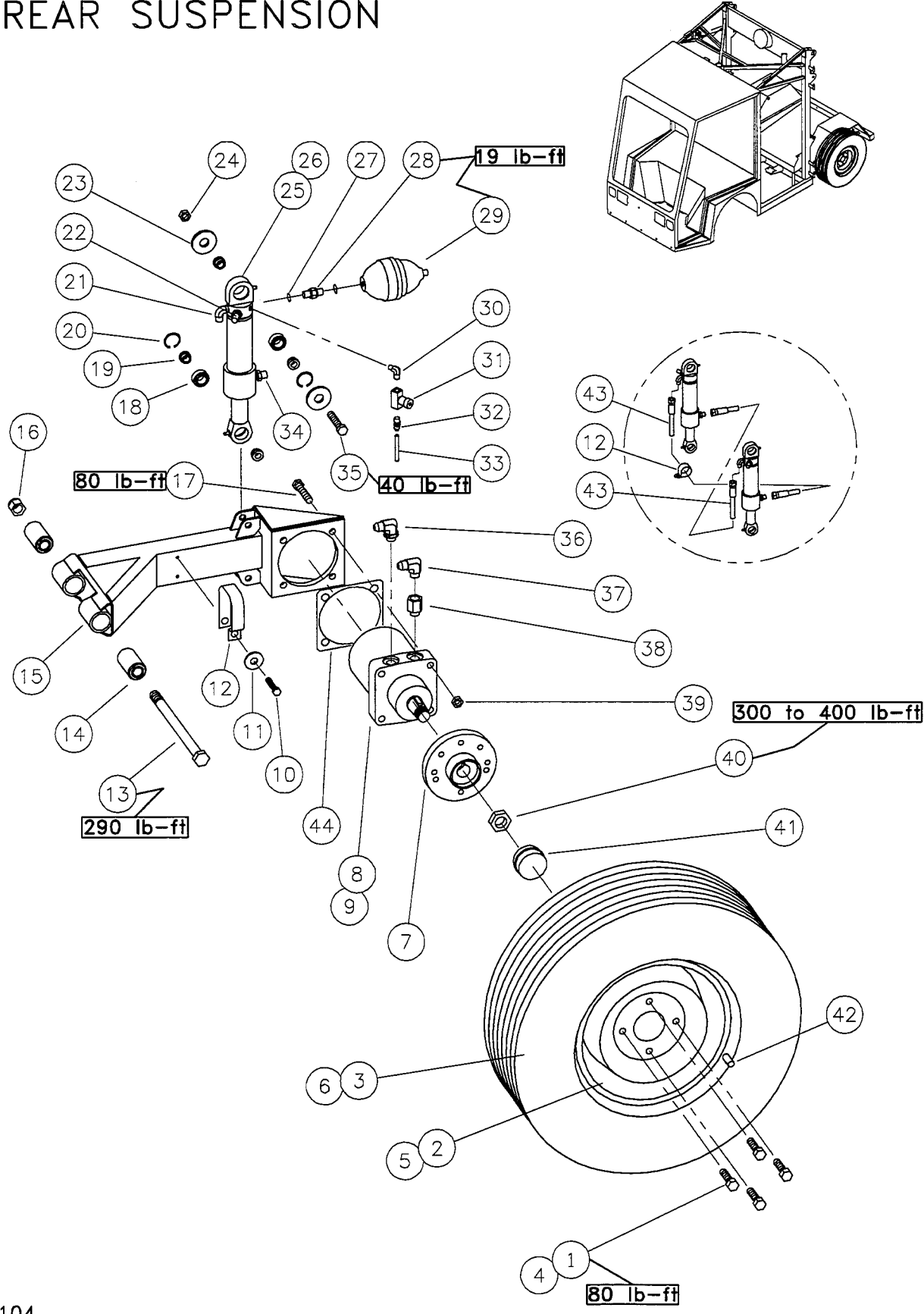


# FRONT SUSPENSION



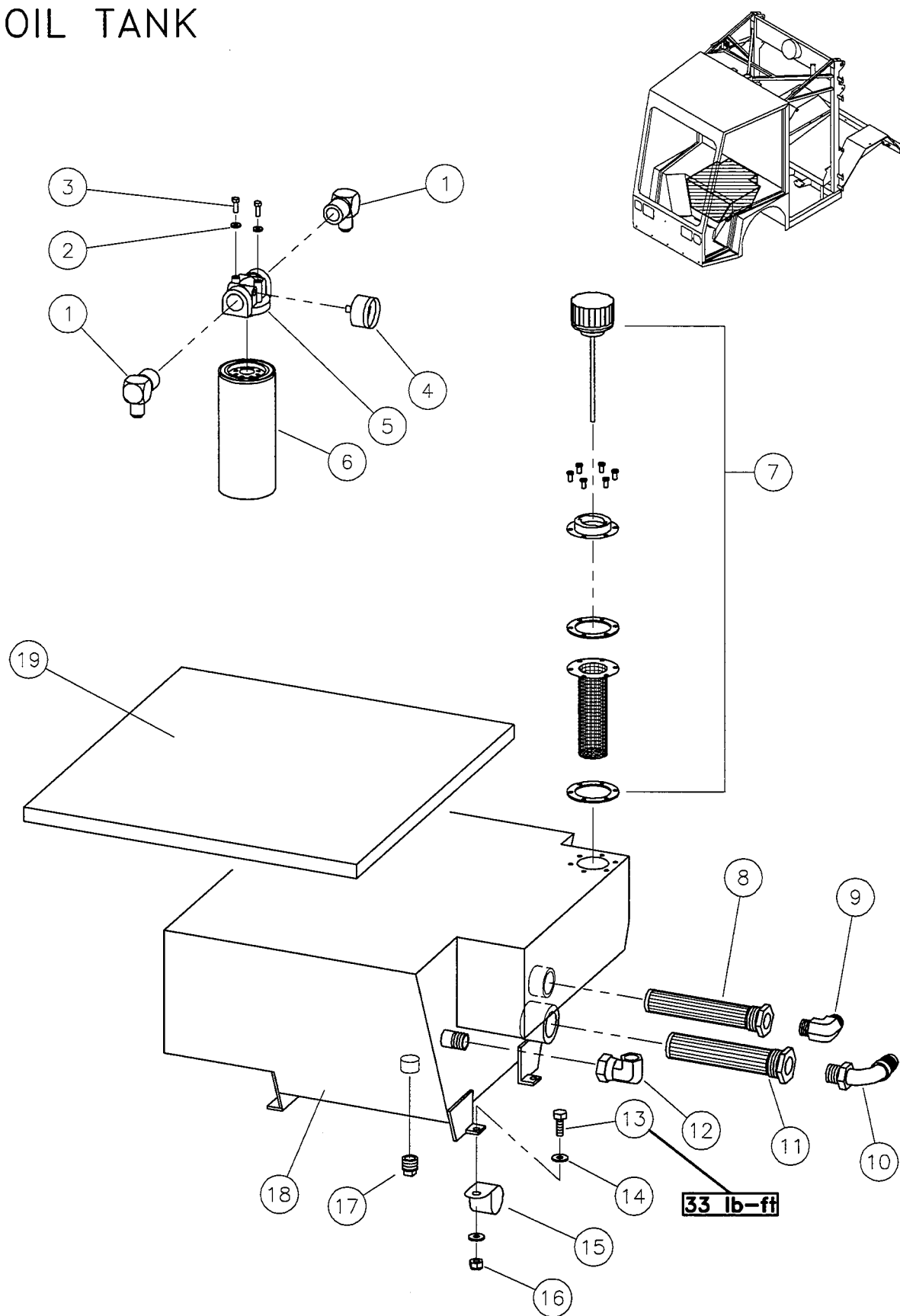
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	27145	Wheel bolt 1/2"-20 UNF X 1 5/8" Lg(radial), TORQUE: 80 lb-ft	8
2	27587	Tire Valve	2
3	28283	Rim (radial)	2
4	28275	Tire (radial)	2
5	27145	Wheel bolt 1/2"-20 UNF X 1 5/8" Lg (Turf),TORQUE: 80 lb-ft	10
6	20046	Rim (Turf)	2
7	22054	Tire (Turf)	2
8	27013	Lower ball joint	2
		Screw hex. head 1/4"-20 UNC X 1" Lg, TORQUE: 14 lb-ft	6
		Lock washer Dia. 1/4"	6
		Lock nut 1/4"-20 UNC, TORQUE: 14 lb-ft	6
9	22219	Front suspension arm right	1
	22218	Front suspension arm left	1
10	27072	Bushing	4
11		Screw hex. head 3/4"-10 UNC 4 1/2" Lg, TORQUE: 290 lb-ft	4
12		Lock nut 3/4"-10 UNC	4
13	27021	Tie rod end & castle nut, TORQUE: 75 lb-ft	2
14	27005	Inner Socket & jam nut, TORQUE: M14 to Steering cyl.: 103 lb-ft	2
15		Screw hex. head 3/8"-16 UNC X 1" Lg, TORQUE: 33 lb-ft	4
16		Lock washer Dia. 3/8"	4
17	26084	Horn	1
18	25233	Clamp 29	1
19	4463	Fitting 45	2
20	22038	Steering cylinder boot	2
21	24776	Steering cylinder	1
22	25055	Seal kit steering cylinder	
23		Screw hex. head 7/16"-14 UNC X 2 3/4 Lg, TORQUE: 53 lb-ft	2
24		Cotter pin	2
25		Washer	2
26	25578	O' ring	4
27		Screw hex. head 1/2"-13 UNC X 2 1/2" Lg, TORQUE: 80 lb-ft	2
28	22180	Strut Rubber washer	4
29	27463	Retaining ring	2
30	22099	Strut spacer	4
31	27465	Spherical ball bushing	2
32	24065	Fitting 45	2
33	24814	Front strut left	1
	24806	Front strut right	1
34	25096	Seal kit front strut	
35	25562	Fitting 90	2
36		Lock nut 1/2"-13 UNC, TORQUE: 80 lb-ft	2
37	25568	Quick coupler male	2
38	25570	Fitting 45	2
39	29231	Screw hex. whiz lock 1/2"-13 UNC X 1 1/2" Lg, TORQUE: 80 lb-ft	2
40		Spring pin Dia. 3/8"	2
41		Lock nut 7/16"-14 UNC, TORQUE: 53 lb-ft	2
42	25400	Valve needle	2
43	24075	Fitting 90	2
44	25320	Hose bleed	2
45	25339	Fitting, TORQUE: 19 lb-ft	2
46	25128	Accumulator front, TORQUE: 19 lb-ft	2
47	22030	Knuckle Left	1
	22031	Knuckle Right	1
48		Lock washer Dia.1/2"	8
49		Screw hex. head 1/2"-13 UNC X 1" Lg, TORQUE: 80 lb-ft	4
50		Screw hex. head 1/2"-13 UNC X1 1/4" Lg, TORQUE: 80 lb-ft	4
51	22234	Front wheel hub ass'y	2
52	9708	Bearings tapered roller and cups kit	2
53	27139	Dust cap	2
54	22277	Front wheel drum	2
55	24067-L	Hose front suspension	2
56	29180	Connecting Washer	2

# REAR SUSPENSION



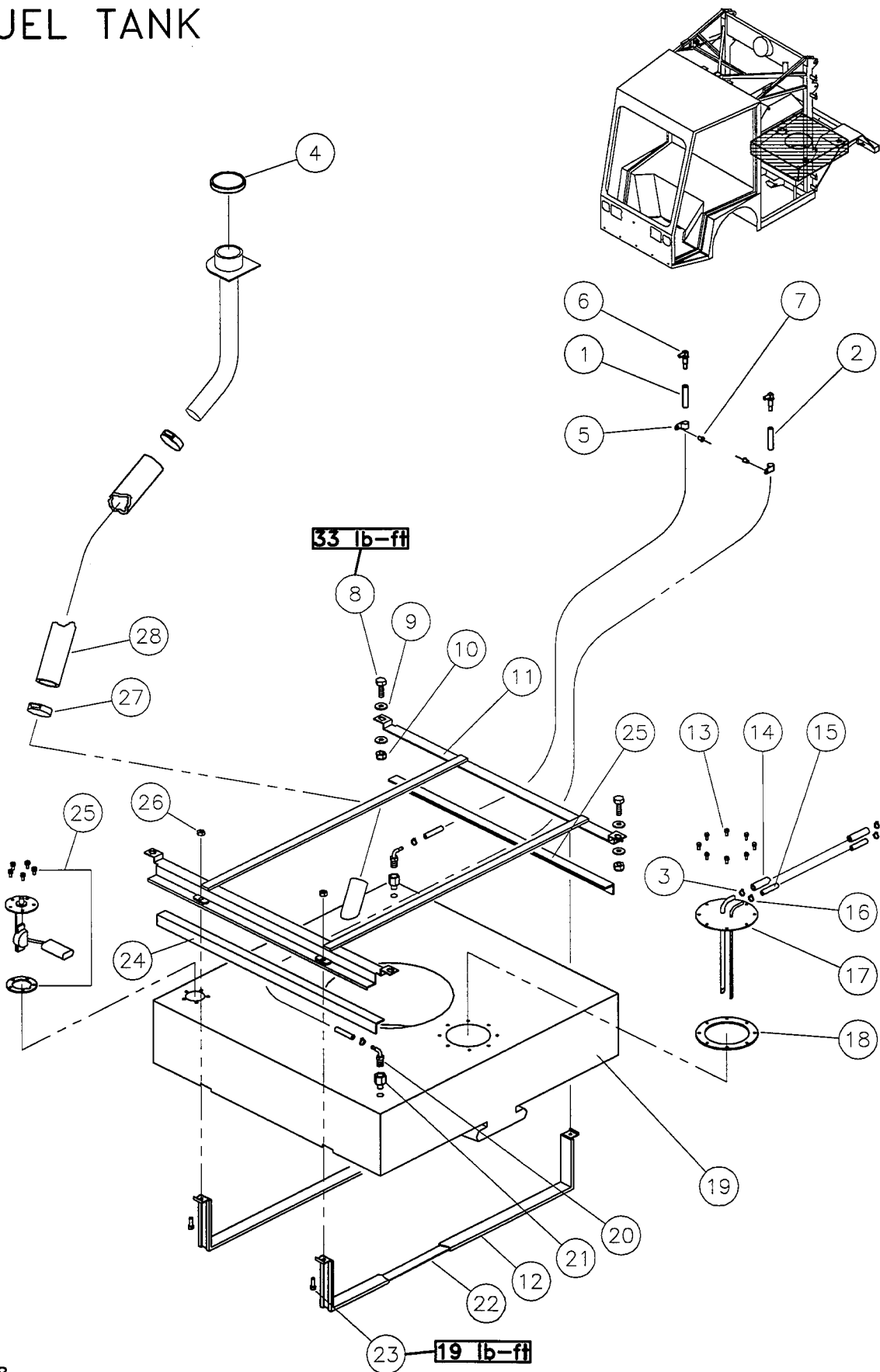
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	27145	Wheel bolt 1/2"-20 UNF X 1 5/8" Lg(radial), TORQUE: 80 lb-ft	8
2	28283	Rim (radial)	2
3	28275	Tire (radial)	2
4	27145	Wheel bolt 1/2"-20 UNF X 1 5/8" Lg (Turf), TORQUE: 80 lb-ft	10
5	20046	Rim (Turf)	2
6	22054	Tire (Turf)	2
7	22013	Rear hub	2
8	25142	Wheel motor	2
9	5311	Wheel motor seal kit	
10		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	2
11		Washer Dia. 1/4"	2
12	25233	Clamp 29	7
13		Screw hex. head 3/4"-10 UNC X 11" Lg, TORQUE: 290 lb-ft	2
14	27072	Bushing	4
15	22005	Rear suspension arm	2
16		Lock nut 3/4"-10 UNC	2
17		Screw hex. head 1/2"-13 UNC X 2 3/4" Lg, TORQUE: 80 lb-ft	8
18	27465	Spherical ball bushing	4
19	22099	Strut spacer	8
20	27463	Retaining ring	4
21	25562	Fitting 90	2
22	25568	Quick coupler male	2
23	22180	Strut Rubber washer	4
24		Lock nut 1/2"-13 UNC	2
25	24784	Rear strut left	1
	24849	Rear strut right	1
26	25118	Seal kit rear strut	
27	25578	O'ring	4
28	25339	Fitting, TORQUE: 19 lb-ft	2
29	25126	Accumulator rear, TORQUE: 19 lb-ft	2
30	4358	Fitting 90	2
31	25112	Valve needle	2
32	24235	Fitting	2
33	25320	Hose bleed	2
34	25576	Fitting	2
35		Screw hex. head 1/2"-13 UNC X 2 1/2" Lg, TORQUE: 40 lb-ft	4
36	4528	Fitting 90	2
37	4749	Fitting 90 (serie 5001-5042)	2
	4439	Fitting 90 (serie 5043+)	2
38	4935	Fitting (serie 5001-5042)	2
	24405	Fitting (serie 5043+)	2
39		Lock nut 1/2"-13 UNC	4
40		Nut, TORQUE: 300 to 400 lb-ft	2
41	27139	Dust cap	2
42	27587	Tire Valve	2
43	24102-L	Hose rear suspension	2
44	22062	Wheel motor spacer 11 Ga	A/R

# OIL TANK



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	25357	Fitting 90	2
2		Lock washer Dia. 1/4"	2
3		Screw hex. head 1/4"-20 X 3/4" Lg	2
4	25314	Oil filter gauge	1
5	24049	Oil filter holder	1
6	25120	Hydraulic filter element	1
7	24057	Filler-breather	1
8	5389	Tank mounted strainer	1
9	4374	Fitting 90	1
10	25363	Fitting 90	1
11	24022	Tank mounted strainer	1
12	25365	Fitting 90	1
13		Screw hex. head 3/8"-16 UNC X 1 1/4" Lg, TORQUE: 33 lb-ft	4
14		Washer Dia. 3/8"	8
15	25233	Clamp 29	1
16		Lock nut 3/8"-16 UNC	4
17	5230	Plug oil tank	1
18	21114	Oil tank 231	1
19	27457	Insulation fiberglass	1

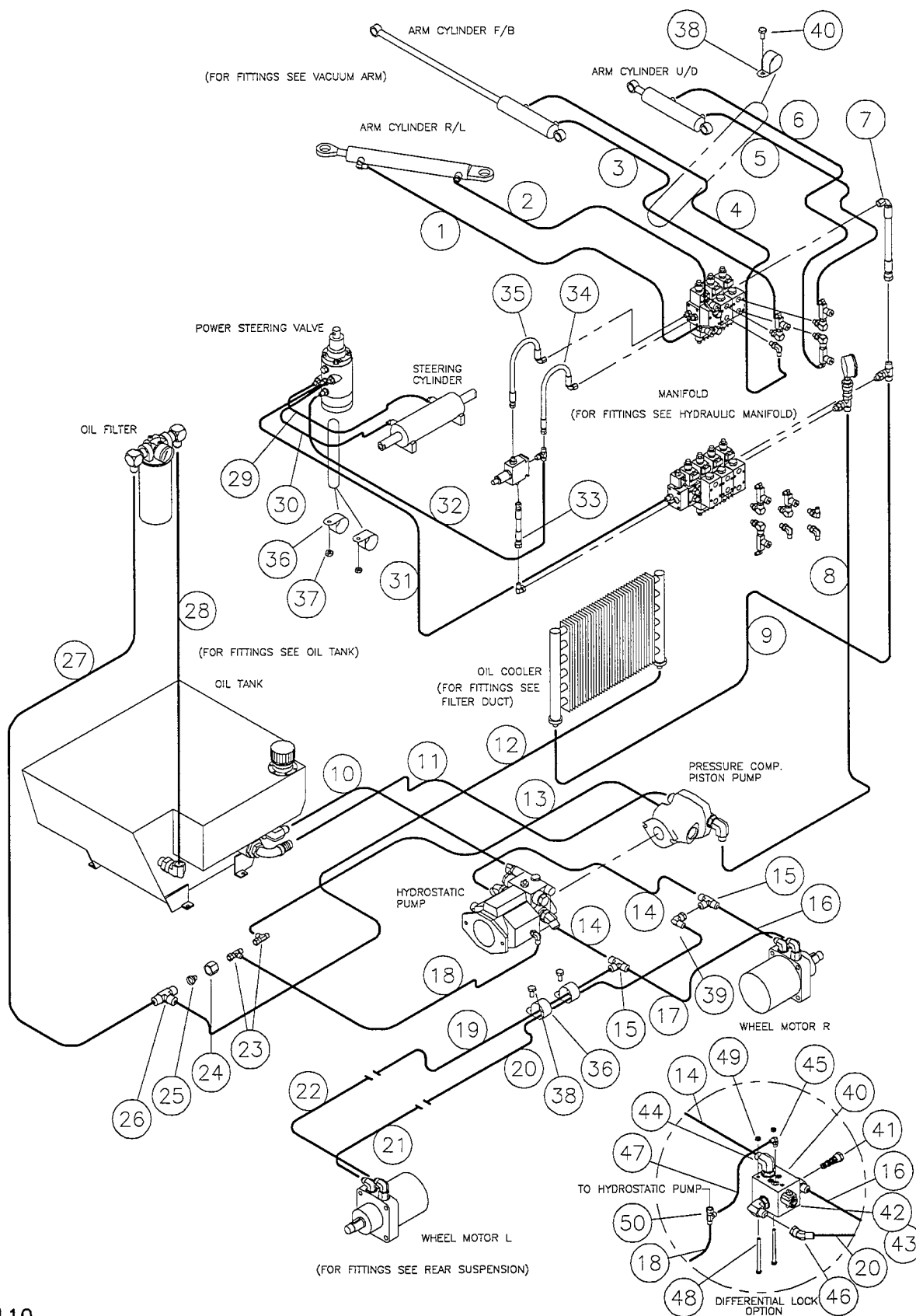
# FUEL TANK



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	25276	Hose vent front 5/16"	1
2	25274	Hose vent rear 5/16"	1
3	27589	Clamp	4
4	28052	Fuel Cap	1
5	25312	Clamp (plastic)	4
6	8051	Fitting 90 (plastic)	2
7		Pop rivet	4
8		Screw hex. head 3/8"-16 UNC X 1" Lg, TORQUE: 33 lb-ft	4
9		Washer Dia. 3/8"	8
10		Lock nut 3/8"-16 UNC	4
11	21198	Fuel tank supporting beam	1
12	27684	Rubber strap	4
13		Screw hex. head 10-32 UNF X 1/2" Lg	8
14	25282	Hose tank to filter	1
15	25284	Hose return	1
16	27662	Clamp	2
17	21220	Tank lid 231	1
18	27609	Rubber gasket	1
19	21171	Fuel tank 231	1
20	25347	Fitting 90	2
21	25349	Fitting	2
22	21163	Tank strap	2
23		Screw hex. head 5/16"-18 UNC X 1 1/4" Lg, TORQUE: 19 lb-ft	4
24	27714	Rubber strap, fuel tank beam	2
25	26396	Fuel sender	1
26		Jam nut 5/16"-18 UNC	4
27	9546	Hose clamp 2"	2
28	25306	Hose (fuel filler)	1

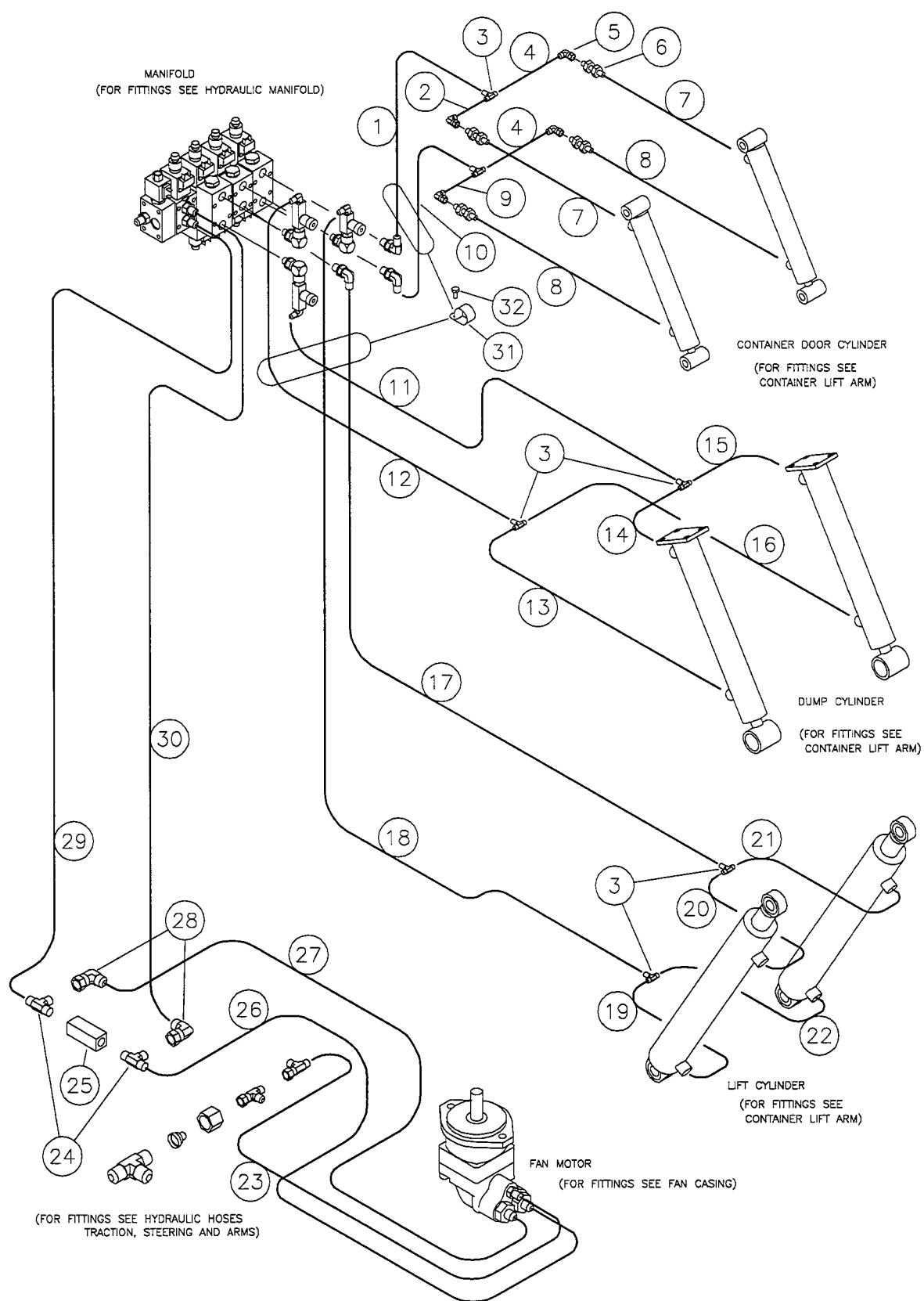


# HYDRAULIC HOSES (TRACTION, STEERING AND ARM)



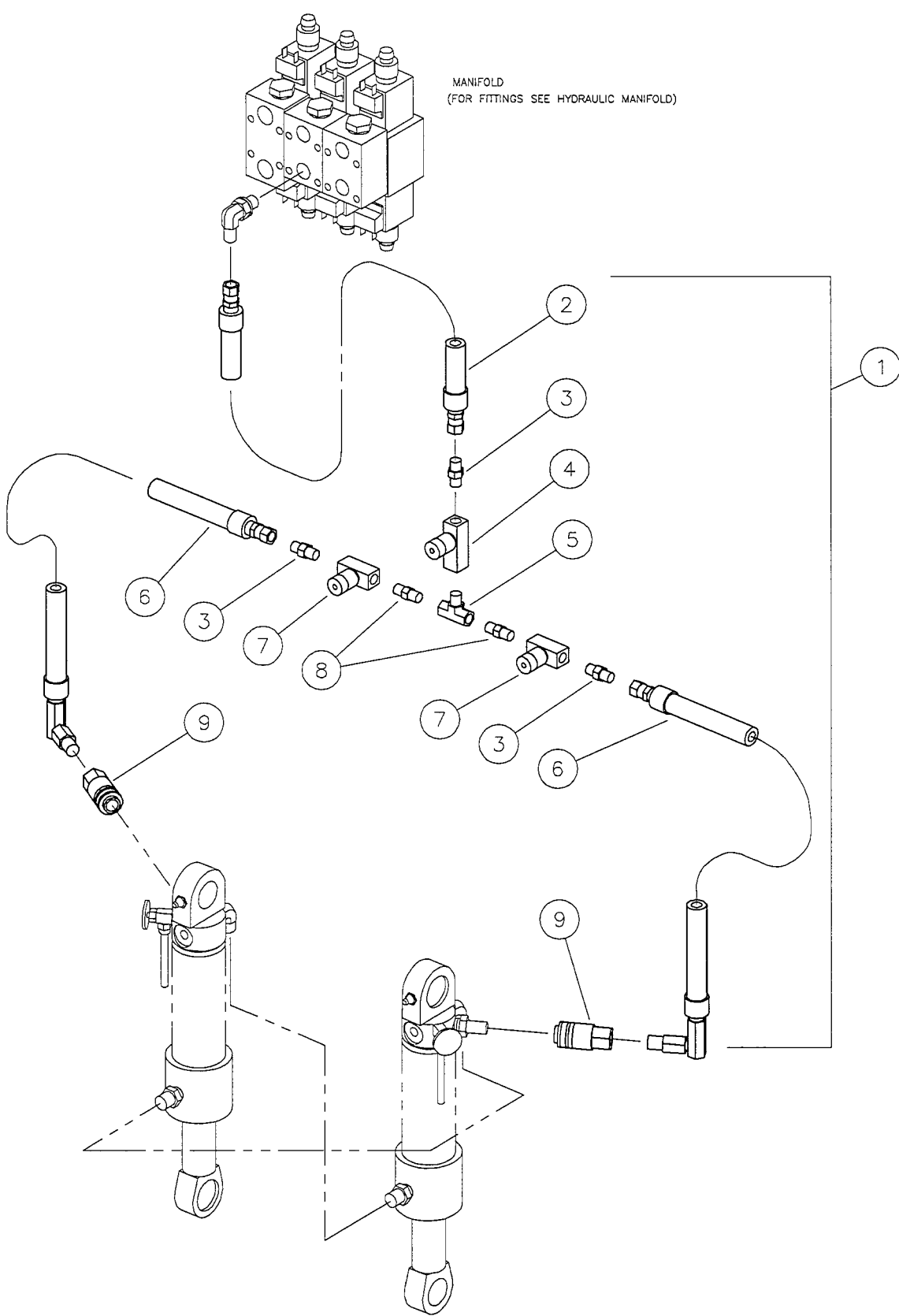
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	24310	Hose assembly	1
2	24288	Hose assembly	1
3	24334	Hose assembly	1
4	24337	Hose assembly	1
5	24318	Hose assembly	1
6	24393	Hose assembly	1
7	24407	Hose assembly	1
8	24164	Hose assembly	1
9	24191	Hose assembly	1
10	24450	Hose assembly	1
11	24695	Hose assembly	1
12	24199	Hose assembly	1
13	24423	Hose assembly	1
14	24016	Hose assembly	2
15	4269	Fitting T	2
16	24413	Hose assembly	1
17	24421	Hose assembly	1
18	24415	Hose assembly	1
19	24383	Hose assembly	1
20	24051	Hose assembly	1
21	24367	Hose assembly	1
22	24375	Hose assembly	1
23	24081	Fitting T	2
24	24103	Fitting	1
25	24111	Fitting	1
26	24130	Fitting T	1
27	24229	Hose assembly	1
28	24221	Hose assembly	1
29	24280	Hose assembly	1
30	24272	Hose assembly	1
31	24442	Hose assembly	1
32	24113	Hose assembly	1
33	24237	Hose assembly	1
34	24253	Hose assembly	1
35	24245	Hose assembly	1
36	25233	Clamp 29	5
37		Lock nut 1/2"-13 UNC	2
38		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	3
39	24391	Fitting 90	1
40	24340	Valve differential lock	1
41	24464	Diff. lock divider / combiner cartridge	1
42	24448	Diff. lock solenoid	1
43	24456	Diff. lock solenoid valve	1
44	4390	Fitting 90	3
45	4412	Fitting 90	1
46	24359	Fitting 45	1
47	24472	Hose assembly	1
48		Screw hex. head 5/16"-18 UNC X 4 1/2" Lg	2
49		Lock nut 5/16"-18 UNC	2
50	25193	Fitting	1

# HYDRAULIC HOSES (VACUUM AND CONTAINER)



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	24636	Hose assembly	1
2	24563	Hose assembly	1
3	24146	Fitting T	6
4	24539	Hose assembly	2
5	25403	Fitting 90	4
6	25401	Fitting	4
7	24504	Hose assembly	2
8	24474	Hose assembly	2
9	24555	Hose assembly	1
10	24628	Hose assembly	1
11	24369	Hose assembly	1
12	24361	Hose assembly	1
13	24644	Hose assembly	1
14	24612	Hose assembly	1
15	24582	Hose assembly	1
16	24590	Hose assembly	1
17	24385	Hose assembly	1
18	24326	Hose assembly	1
19	24671	Hose assembly	1
20	24679	Hose assembly	1
21	24620	Hose assembly	1
22	24598	Hose assembly	1
23	24296	Hose assembly	1
24	24154	Fitting T	2
25	24162	Valve check	1
26	24466	Hose assembly	1
27	24083	Hose assembly	1
28	24170	Fitting 90	2
29	24059	Hose assembly	1
30	24458	Hose assembly	1
31	25233	Clamp 29	1
32		Screw self tap hex. head 1/4"-20 UNC X 3/4" Lg	1

# SUSPENSION LEVELING HOSE KIT



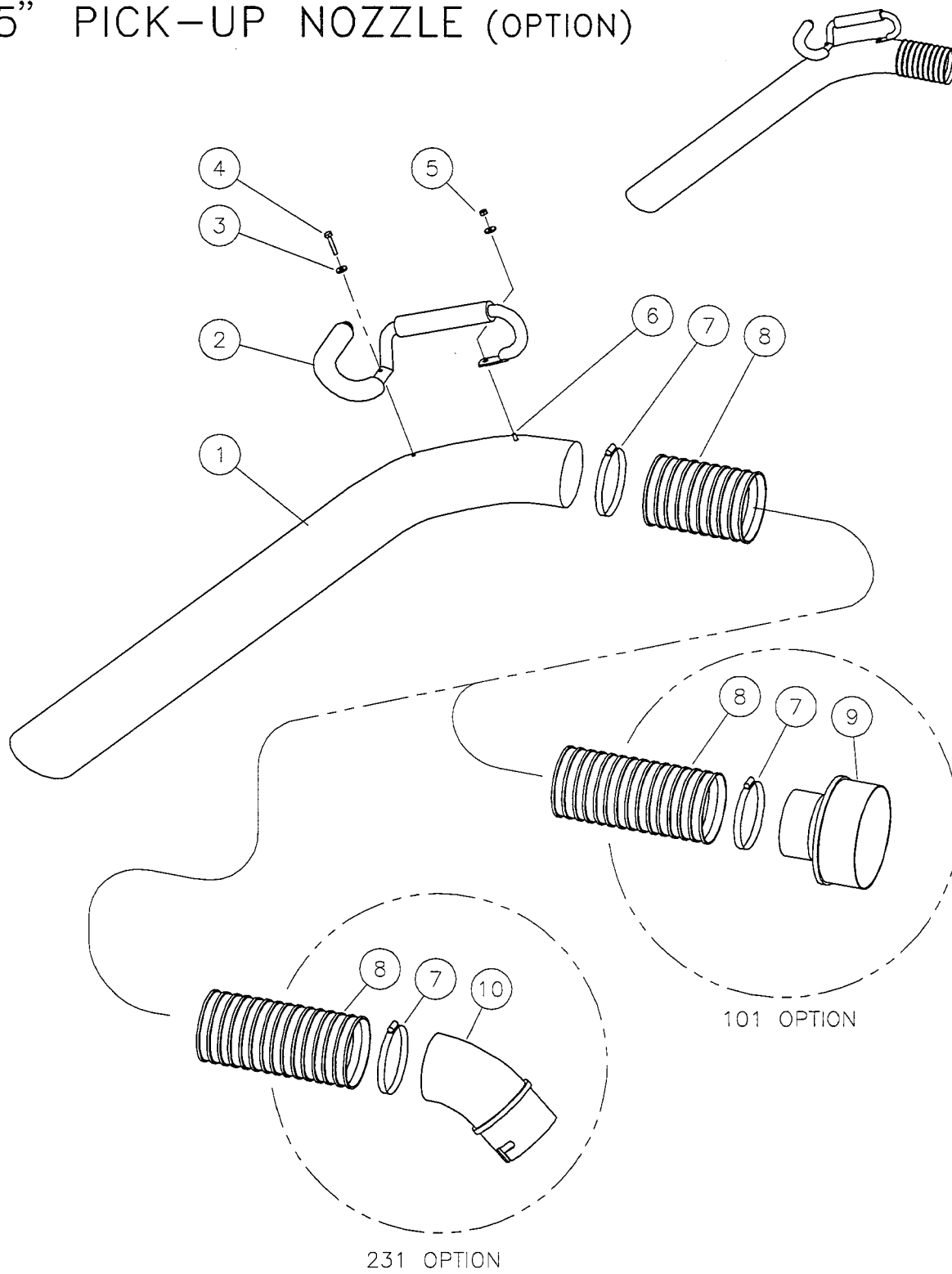
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	24294	Hose suspension leveling kit ass'y	1
2	24278	Hose assembly	1
3	4242	Fitting	3
4	25098	Valve flow control	1
5	24189	Fitting T	1
6	24286	Hose assembly	2
7	25112	Valve needle	2
8	24197	Fitting	2
9	24200	Quick coupling	2



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
	6040	Automotive relay	3
	6628	Back-up alarm	1
	26070	Back-up light	2
	6393	Battery	1
	6369	Battery boot	1
	26213	Battery ground cable	1
	26211	Battery positive cable	1
	26203	Blank dash covers	1
	26232	Defrost fan	1
	6032	Diode	1
	6563	Dome light ( <i>inside cab &amp; engine compartement</i> )	2
	26394	Engine ground cable	1
	6210	Flasher arm	1
	6229	Flasher unit	1
	26300	Front flasher	2
	6075	Fuel gauge	1
	26396	Fuel sender	1
	26418	Fuse block c/p	1
	6326	Fuses 15 Amps	11
	6636	Fuses 20 Amps	1
	6067	Gauge ammeter	1
	26041	Gauge illuminating light	5
	26068	Hand brake switch	1
	26084	Horn 12V , 400HZ	1
	6059	Hourmeter gauge	1
	6105	Ignition switch & key	1
	26337	Joy stick	1
	26270	LIGHT ( back-up light )	2
	26254	LIGHT ( head light )	2
	26289	LIGHT ( licence plate )	2
	26262	LIGHT ( tail light )	6
	26264	LIGHT ( tail light X1 )	2
	26256	LIGHT (front parking)	2
	26291	LIGHT (rot. light replacement)	2
	26580	Light pilot Fan and container	1
	26599	Light pilot Oil and temperature	1
	26574	Light pilot Parking and flasher	1
	6557	Oil pressure gauge	1
	26043	Oil pressure sender	1
	26011	Oil pressure switch	1
	26416	Solenoid	1
	26556	Switch & symbol Beacon	1
	26564	Switch & symbol Container door	1
	26572	Switch & symbol Container lift	1
	26566	Switch & symbol Container tilt	1
	26558	Switch & symbol Defrost fan	1
	26507	Switch & symbol Dome light	1
	26542	Switch & symbol Glow plugs	1
	26513	Switch & symbol Hazards	1
	26548	Switch & symbol Head lights	1
	26550	Switch & symbol High beam	1
	26523	Switch & symbol Joy stick	1
	26515	Switch & symbol Shaker	1
	26521	Switch & symbol Vacuum	1
	26661	Switch & symbol Differential Lock (option)	1
	26345	Switch (engine compartment light)	1
	26062	Switch Back-up & neutral	2
	26408	Switch Brake light	1
	26033	Switch Wiper	1
	6520	Temperature sender	1
	26378	Temperature switch	1
	6512	Gauge Water Temperature	1

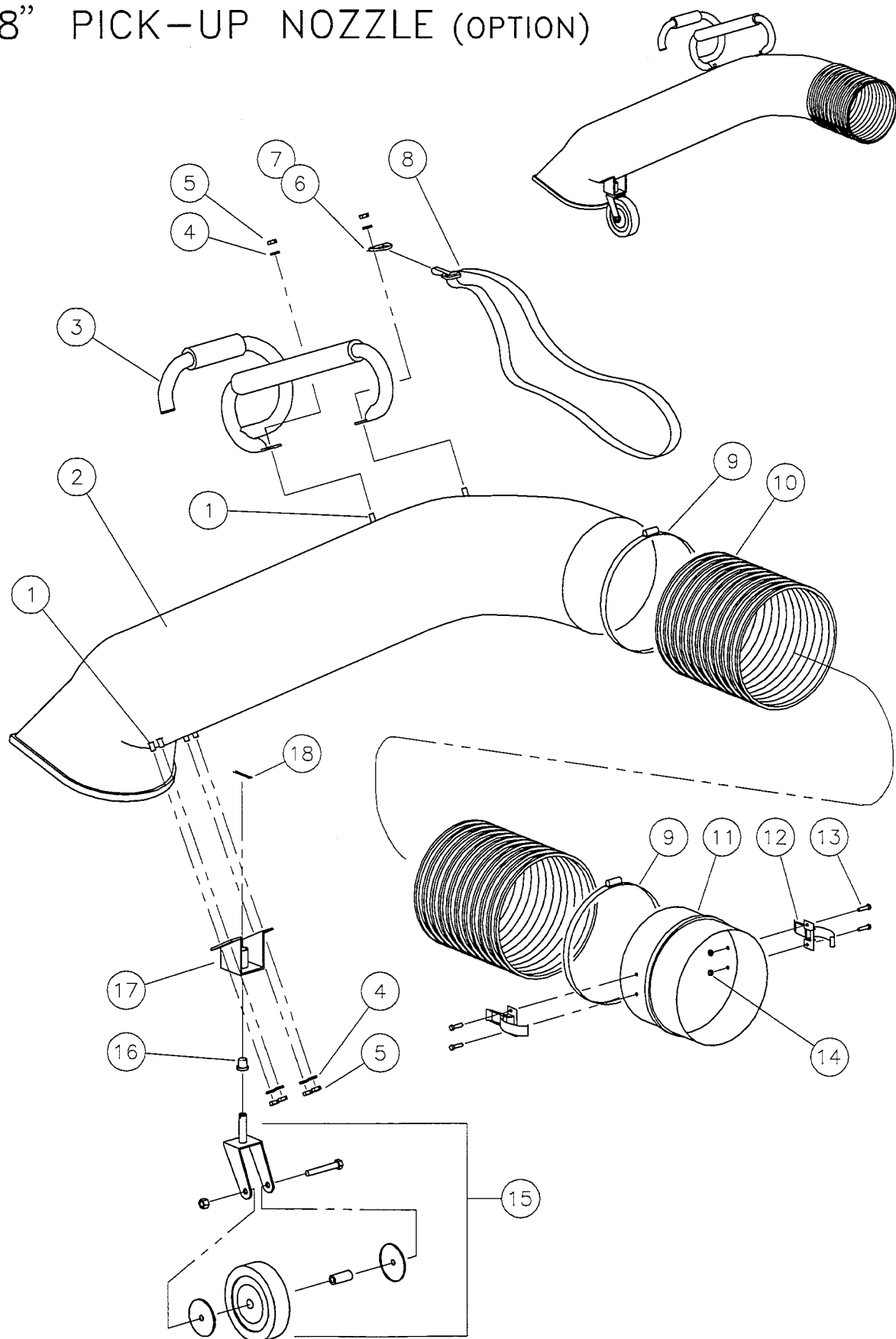


## 5" PICK-UP NOZZLE (OPTION)



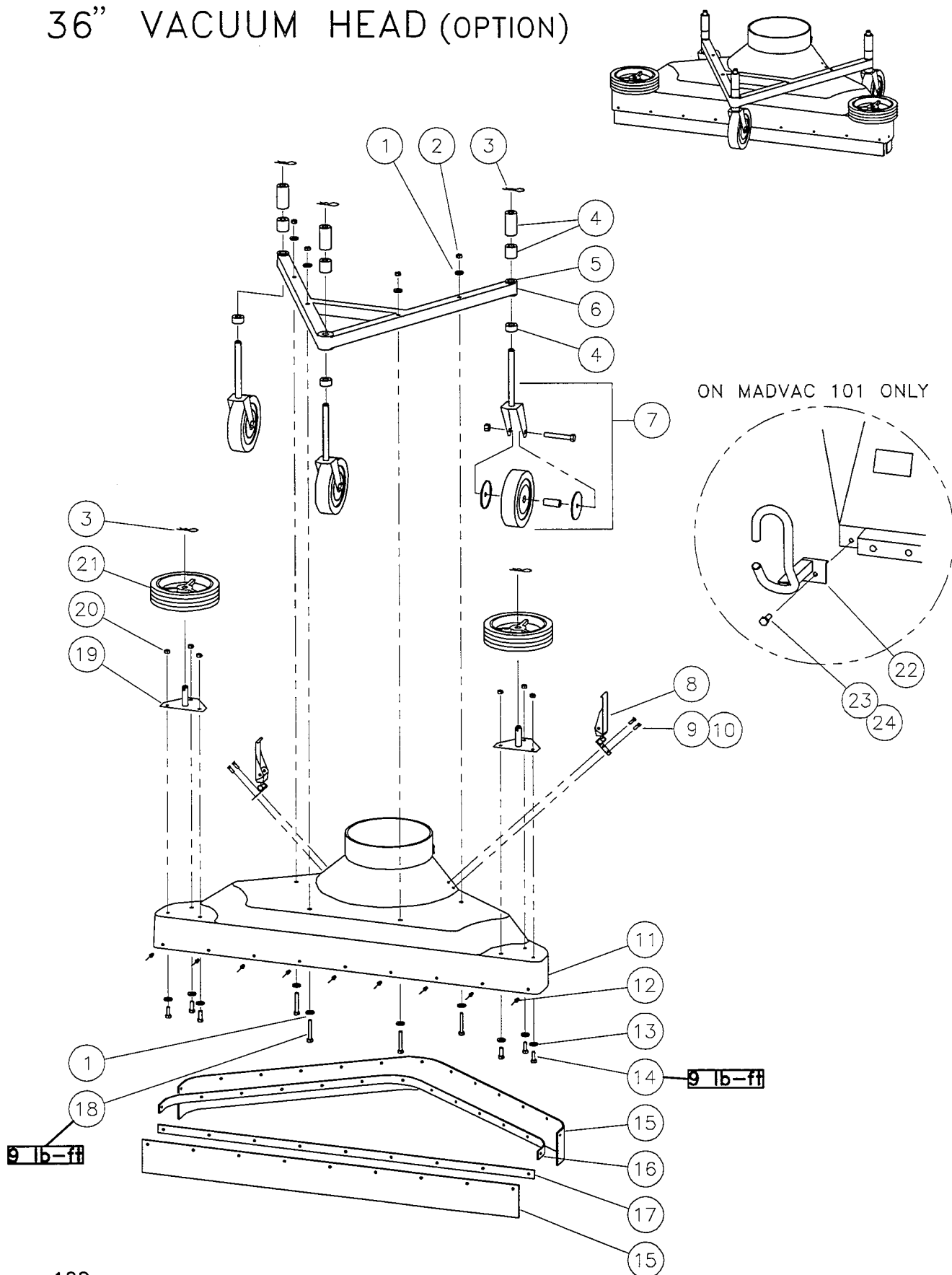
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
	<b>3424</b>	<b>15' Extension and 5" Pick-Up Nozzle for 101</b>	
	<b>29086</b>	<b>25' Extension and 5" Pick-Up Nozzle for 231</b>	
1	3440	Dia 5" pick-up nozzle	1
2	29069	Dia 5" pick-up nozzle handle	1
3		Washer	2
4		Screw hex. head 1/4"-20 UNC X 1 1/2" Lg	1
5		Lock nut 1/4"-20 UNC	1
6		Carriage bolt 1/4"-20 UNC X 3/4" Lg	1
7	8566	Clamp	2
8	8558	Hose 5" (101)	1
	28397	Hose 5" (231)	1
9	3432	8" to 5" reducer	1
10	23168	5" extension Adaptor	1

# 8" PICK-UP NOZZLE (OPTION)



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
	<b>29017</b>	<b>18 ft Extension and 8" Pick-Up Nozzle</b>	
	<b>28354</b>	<b>18 ft Extension and 8" Pick-Up Nozzle with rack</b>	
1		Carriage bolt 5/16"-18 UNC X 3/4" Lg	6
2	29018	Dia 8" pick-up nozzle	1
3	29077	Dia 8" pick-up nozzle handle	1
4		Washer	6
5		Lock nut 5/16"-18 UNC	6
6	8582	D-ring	1
7	8337	D-ring clip	1
8	8590	Shoulder strap	1
9	8507	Clamp	2
10	27050	Hose 8"	1
11	13092	dia 8" to dia 8" coupler	1
12	7497	Clamp (hood clamp)	2
13		Screw hex. head 10-32 UNF X 3/4" Lg	4
14		Lock nut 10-32 UNF	4
15	29164	Wheel caster ass'y	1
16	27692	Bushing (bronze)	1
17	29123	Dia 8" nozzle wheel support	1
18	27544	Hitch pin clip	1

# 36" VACUUM HEAD (OPTION)



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
	<b>23973</b>	<b>36" Vacuum Head Ass'y</b>	
1		Washer	8
2		Lock nut 1/4"-20 UNC	4
3	27544	Hitch pin clip	5
4	29150	Wheel spacer kit (1/2", 1", 2")	3
5	27692	Bushing (bronze)	3
6	29107	36" nozzle support	1
7	29156	Wheel caster ass'y (36" nozzle)	3
8	27694	Latch	2
9		Screw flat head square drive 6-32 UNC X 3/4 Lg	4
10		Lock nut 6-32 UNC	4
11	23974	36" suction nozzle	1
12		Pop rivet	22
13		Washer	6
14		Screw hex. head 1/4"-20 UNC X 3/4" Lg, TORQUE: 9 lb-ft	6
15	27706	Rubber lips kit	1
16	23166	Contour lip holder	1
17	23160	Front lip holder	1
18		Screw hex. head 1/4"-20 UNC X 1 3/4" Lg , TORQUE: 9 lb-ft	4
19	29201	Side wheel axle	2
20		Lock nut 1/4"-20 UNC	6
21	27708	Wheel (side)	2
22	11065	Arm holder for Madvac 101 only	1
23		Screw hex. head 1/4"-20 UNC X 1 1/4" Lg	1
24		Lock nut 1/4"-20 UNC	1

# 10 INDEX

I	PAGE
Introduction .....	1
O	
Operation .....	10
Controls .....	13
Engine Compartment .....	19
Lower Cab Instruments .....	17
Upper Cab Instrument Panel .....	13
Emptying The Container .....	24
How The Machine Works .....	11
Machine Break-In .....	12
Operating .....	21
Pre-Operation Checklist .....	12
Starting .....	20
Stopping .....	21
Storage .....	26
Placing In Storage .....	26
Removing From Storage .....	26
To the New Operator or Owner .....	10
Transporting .....	25
Options .....	49
Differential Lock .....	49
15 Foot Extension Inlet .....	49
36 Inch Vacuum Head .....	49

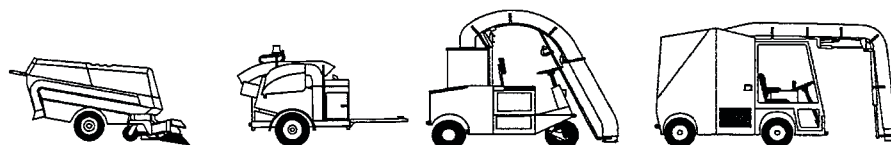
S	PAGE
Safety .....	2
Battery Safety .....	6
General Safety .....	3
Hydraulic Safety .....	4
Maintenance Safety .....	5
Operating Safety .....	4
Refueling Safety .....	6
Safety Signs .....	6
Sign-Off Form .....	7
Storage Safety .....	6
Tire Safety .....	5
Transport Safety .....	5
Safety Sign Locations .....	8
Service and Maintenance .....	27
Adjustments .....	45
Brake Adjustment .....	46
Electrical System .....	45
Engine Speed Settings .....	48
Intake Tube Lift Speed .....	45
Intake Tube Replacement .....	48
Neutral Position and Neutral Start Adj. ....	47
Pedal Angle Adjustment .....	46
Maintenance .....	39
Air Cleaning Maintenance .....	40
Cleaning Dust Screen .....	44
Cleaning Engine and Compartment ....	41
Changing Hydraulic Oil .....	43
Control Cable Lubrication .....	43
Engine Oil and Filter Changing .....	39
Fuel Filter .....	40
Hydraulic Oil Filter Changing .....	42
Hydraulic System Testing .....	44
Service .....	27
Fluids and Lubricants .....	27
Greasing .....	28
Service Record .....	38
Servicing Intervals .....	29
Towing .....	48
Specifications .....	52
Bolt Torque .....	58
Electrical 231D Diesel .....	54
Hydraulic Schematic .....	56
Mechanical .....	52

## T

Troubleshooting .....	50
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